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WE PUBLISH this week the second of a series of four articles by Mr. Curle, in the course of which he gives, without any circumlocution, the present status of the gold mining industry of the Rand. These articles will interest our readers in this country, because they are an unvarnished description of the most important mining region in the world, by a man who is thoroughly possessed of the facts. In this connection attention may be drawn also to a letter by Mr. G. A. Denny, who replies to a friendly criticism recently made in these columns in regard to the apparent disregard of certain facts by the distinguished engineers who direct operations in South Africa.

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ON ANOTHER page we publish a spontaneous tribute to the good work of the United States Geological Survey in the distant regions of the Northwest. We heartily endorse this commendation of the labors of the intrepid geologists, whose investigations are increasingly appreciated by experienced mining men in Alaska. It marks distinct progress in the scientific development of mining when engineers and managers find themselves under a debt to the maps and reports of the Survey. We trust that mutual goodwill and respect may ever flourish between the geologists and engineers who, despite pleasant controversy, have the same purpose in view—namely, the application of science to industry.

⚒

THE CANADIAN Government has consented to the extension of the term under which bounties will be paid for the manufacture of iron and steel in the Dominion. The new scale is not exactly a readjustment of the old; it amounts simply to a postponement of the time at which the reduction of bounties will begin. For the fiscal year, which began July, 1903, the same rates will be paid as last year, and the gradual reduction will not begin until July 1, 1904. Under the schedule, it is proposed to pay a bounty of $3 a ton on all steel in which more than half the raw material is of Canadian origin. The bounty on pig iron is $3 for iron made entirely from Canadian ores, and $2 on iron made from foreign ore. In addition to this, there is a bounty of $3 on puddled and other bars. This readjustment of the scale will make a considerable difference to the Dominion Iron and Steel Company, which is the most prominent recipient of the bounty.

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THE DROUGHT AT Broken Hill, New South Wales, which has affected mining operations in that important lead and silver producing district, has been, we learn by cable from our correspondent, partially overcome by the energetic measures which have been taken. The Broken Hill Proprietary—the big mine—has completed a condenser plant; the mine water will be used in the mill which concentrates the zinc-lead ores. The South Australian Government, which owns the railroad to Adelaide, has arranged for the transport of 800,000 gals. of water weekly, so that the other mines at Broken Hill will be enabled to work two-thirds time. In the meantime the smelters at Port Pirie are working on accumulated stocks of ore, and before these are exhausted there is every hope that fresh supplies will be sent down from the mines. We congratulate our Australian friends on their energy and resource under the trying circumstances due to this unusual drought.

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NEXT MONTH a new railroad in Seward Peninsula will be added to the utilities of Alaska. It is but a small thing by way of length, but it marks another effort to afford those facilities for transport which are to-day the crying need of the mining country of the North. The little road will minister to the necessities of the Cape Nome region, starting at the mouth of the Solomon River and terminating, for the present, at Council City, 51 miles inland.

Alaskan railroads are not numerous, but those which exist have proved as beneficent as they are profitable. Supplies which went over the White Pass at a cost of 30c. to $1 per pound, delivered, are now borne from Seattle to Dawson per the White Pass & Yukon Railroad for 4¾c. per pound. A little road, known as the "Wild Goose Railroad," from Nome to Anvil Creek, only 5 miles inland, was paid for nine times over in the course of last season. Therefore the prospects for Alaskan railroads are promising from both points of view, that of the enterprising men who construct them and that of the regions whose development they stimulate.

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THEORIES AND FACTS.

"A vast number of native workings or pits are to be met with all over the property and from them the natives have been getting their gold for generations. The gold itself is coarse and is scarcely, if at all, waterworn, and this plainly shows that it has, in all probability, been shed by the outcrop or reefs in the neighborhood; this leads me to believe that the reefs having shed their gold, or a portion of it at

any time, at the surface, will increase in richness at a lower level, where this shedding of gold has not taken place." This is quoted from a report on a West African concession. It is an example of the specious explanations which are allowed to pass as geological theories. As a matter of fact, there are plenty of examples, in our Southern States, in Otago (New Zealand), in Eastern Siberia, and elsewhere, of fairly rich gravel deposits traceable to insignificant, worthless gold-quartz veins. The natural conditions have favored successful placer and dredge-mining, while they have been fatal to lode mining on a large scale because numerous and scattered small seams may, by weathering and concentration, yield enough gold to make a remunerative detrital deposit; while not one, nor several together, of such seams can be exploited successfully as a lode mine.

The enrichment of gold and copper deposits by secondary action is now thoroughly recognized by well-informed engineers, and it should prevent the repetition of the old blunder of making far-reaching conclusions as to the permanent richness of unexplored occurrences of these two important metals, or an inference such as that quoted above.

The mechanical concentration of gold outcrops by reason of the removal, by weathering, of the more soluble pyrite, likewise the chemical enrichment of the shallow portions of quartz veins through the leaching of gold by the ground-water and its redeposition near the base of the zone of ground-water—these are processes which are now fairly well established among knowledgeable men.

In regard to copper, the removal of that metal when contained by a low-grade copper pyrite, and its deposition deeper down, so that masses of pyrite too low in copper to be worked at a profit become converted into shoots rich in copper glance—this, too, has passed into the domain of ascertained fact and demands that an engineer in examining an occurrence of copper ore shall take great care to satisfy himself whether his calculations are based upon ores which are at the zone of enrichment, above it, or below that important horizon.

Geological considerations such as these have a practical importance demanding attention from those who undertake to appraise the chances of mines and mining districts.

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MINING IN HISTORY.

The search for the metals has ever been a spur to discovery and development from time immemorial. Six thousand years ago Egypt rose to affluence by reason of the opening up of the copper mines of Maghara, in the Sinai Peninsula; this created a great trade route between the Nile Valley and the far East; similarly, Asiatic adventurers from Babylonia and Assyria worked their way westward to the gold mines of Nubia, the copper of Cyprus, and finally reached the gold mines of Spain. The Assyrian failed to conquer Lydia, whence Croesus drew his gold, but the Persian succeeded and thereby established his power. Rome gradually won the dominion of the countries which fringed the Mediterranean and established her rule largely by reason of the metallic wealth she thus controlled. The silver mines of Laurium, in Greece, and of Algeria, the gold mines of the southern Urals and the iron mines of Asia Minor are feeble survivors of the mining districts of more than 2,000 years ago. The product of the mine furnished the sinews of war. Hamilcar, and his more illustrious son, Hannibal, both were supported in their campaigns against the Romans by the resources of the gold mines of Spain and, in a much later day, when Rome was tottering, Trajan was aided by the rich tribute wrung from the gold mines of Dacia, a province now represented by Transylvania, where, at Nagyag and Verespatak, profitable mining continues to this day.

The Phoenician invaded Cornwall in search for tin and the Cornishman has invaded the rest of the world ever since. In "the spacious times of great Elizabeth" he and his Devonshire neighbor began the prospecting of the Americas. Europe was no sooner over-run by Asia than Europe in turn resumed the march of empire, always westward. From the day when Balboa "stood lone upon a peak in Darien" to that yesterday of '49 when the later Argonauts streamed through the passes of the Sierra Nevada, the miner has ever been on the skirmish line of civilization. The sea captains of Elizabeth and the buccaneers of the Spanish main were but prospectors on a scale of 12 inches to the foot, and in our own time the pioneers, who have painted red all the blank spaces on the map of the world, have, too, been impelled by the old historic fever.

Truly, it has been a great seeking and finding. The story of it may have been staled by commonplace and the romance of it dulled, often enough, by greed, yet, in the main, it has linked the generations of earth as with a golden thread—and if not golden only, then there has been the red glint of copper or the white sheen of silver. Mining districts come and go, but mining remains.

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THE AMERICAN MINING CONGRESS.

The American Mining Congress will hold its sixth annual session at Deadwood and Lead, South Dakota, on September 7th to 11th. This organization is successor to the International Mining Congress, which proved such a dismal failure. It was used as a stalking horse for political schemes connected with a proposed national Department of Mines. Politics proved its undoing; politics generally does make a pretty mess of matters with which it has no business to meddle. So now we have the American Mining Congress and instead of a nondescript organization the new enterprise has enlisted the services of such capable men as Charles W. Goodale, Walter H. Weed, E. W. Parker, J. W. Neill, John Hays Hammond and other men of affairs. Under these auspices we expect to see good results. What exact field of usefulness is open to the Congress, time will show. It will, it is to be hoped, keep clear of political schemes, the unrestrained booming of mining districts, mere wordiness of resolutions, oratorical confectionery and other dangerous shoals, choosing rather to steer for the open sea of useful endeavor. The pilots are better than they used to be.

An example of the notions to be avoided is afforded by a recent meeting of the Black Hills Mining Men's Association, held in connection with the forthcoming session of the Congress. On that occasion there was advocated a scheme for educating the people of the mining regions in mining and metallurgy. It was pointed out that the Federal Government contributes annually over $10,000,000 in behalf of the agricultural industry, as, for example, in appropriations to State agricultural colleges and in a bureau of agriculture; therefore, it was claimed that similar financial aid should be forthcoming for the mining schools, and that there should be more of them; it was desired not only to train mining engineers and managers, but "to educate the public so that mining may receive recognition as a legitimate industry," etc. Experimental laboratories, assay offices and advice in general should be provided at government cost.

This is paternalism gone mad. In the first place, there are schools of mines enough already, but they are insufficiently endowed and they are undermanned. There are not enough capable instructors to-day to supply existing institutions, and the mere multiplication of them will mean instruction by incompetent men at suitably inadequate salaries until the present spread of pseudo-science and vague technical knowledge—itself more harmful than honest ignorance—will proceed apace, to the general bewildering of the community.

It is a fact that our existing technical schools and colleges have advanced so fast, in their scheme of instruction, in their apparatus and in the number of their pupils, that they are severely crippled for the want of funds. The adequate endowment of these well-tried and well-organized schools, whether by Government, State or public subscription, is more likely to advance the best interests of technical education than the proposed increase of local institutions, meanly financed and, as a consequence, provided with third-rate instructors at fourth-rate salaries. If the mining industry is not properly served to-day by a sufficient number of competent men it is not because the means for early education are wanting, but because young men jump from their college studies to positions for which they are unfitted by lack of experience. The old-fashioned period of practical training, when a youth was apprenticed to an older man and learned his trade or profession from the ground up, has been apparently eliminated from the curriculum of professional life. Young men expect to become consulting engineers in a year or two, and others think that though they skip all the subordinate posts they are qualified to direct big mines and smelters. Such short cuts inevitably undermine the efficiency of the professional man. We trust that the directors of the American Mining Congress will put this into the pipe of deliberation and smoke it.

Next comes the vague notion to educate the public in mining matters. This is a large order, and one which the Congress had better leave alone. The only way to "educate the public" is through its pocket nerve, that ganglion of financial sensibility which comes into play when it is "touched" in its tenderest spot. Experience proves amply that warnings against get-rich-quick methods are wasted, and that no amount of education will have the effect which follows from the corroding effects of actual financial disaster. In the meantime, however, if the Congress wants to safeguard the best interests of mining in this direction, it can do so by using its influence with the Government, both state and National, by demanding the enforcement of the law against the rascality of irresponsible promoters and, more especially, by the closer observance of the regulations which are intended to prevent the use of the mails for fraudulent purposes. After that let it keep from its membership and its meetings the individuals who earn a precarious livelihood by prey-

ing upon the gullibility of humanity. You cannot get rid of the stupidity of those who expect something for nothing and a gold mine for a song, but you can make it increasingly difficult for the vulture class which fattens on such human folly.

In these and similar directions the American Mining Congress may do good service.

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MARKET CONDITIONS.

The metal markets show very little change from last week. While consumption continues, apparently, on a very good scale, there is little buying, and purchasers seem content to let matters drift as long as their immediate necessities are provided for. Wall Street liquidation, which has brought prices of stocks down to what seems, by comparison, a very low figures, is largely responsible for this; while a general conviction that prices will go lower, if a waiting policy is persisted in, must also be considered.

Copper has been rather flat, and consumers have shown little interest in the market; at the same time, when orders are placed, immediate delivery is generally required, showing that the metal is needed at once, to keep factories going. It is evident that manufacturers generally, especially those who use copper on a large scale, are holding back in the hope of a lower range of prices. The market, on the other side, has been rather quiet. The stoppage of work at the Anaconda, to which reference was made last week, while nominally made in order to permit the connection of the furnace with the new flue which is to carry off the waste gases, is believed, in some quarters, to have been made in anticipation of trouble with the employees.

Tin is also dull, with only a moderate amount of business doing. Changes in prices have been slight.

Lead is rather scarce, owing to the labor troubles in the West, and there is a general belief that a higher range of prices will be established on that account. It is understood that the chief producer is not willing to guarantee deliveries under three weeks from the date of order. The Southeast Missouri District has also been showing a small production on account of strikes.

Spelter continues in good demand from galvanizers, who appear to be very busy. The metal is in better supply now, the delays on the Western railroads caused by floods being over; but the demand has caught up to the supply, and more.

In silver very little change is noted. Eastern business continues dull, and the European orders have generally been filled.

The iron market continues to be a waiting one, and no special change is reported. The chief incident of the week has been a reduction of $1.50 per ton in pig iron made by the Alabama Furnace Association. This brings the basis down to $14 for No. 2 foundry, at furnace. This had been preceded by considerable cutting in prices, by the furnaces outside the association. There has been no sufficient time since the reduction to say whether buying will be stimulated. In finished material there is very little to say, though it is expected that the probable settlement of the building strikes will be followed by increased buying of structural material.

The Western coal market is quiet, and in satisfactory condition, so far as local and city trade is concerned. In the Lake trade there are still complaints about delays in railroad traffic. Shipments up the Lakes, however, to July 1, are the largest on record.

The Atlantic seaboard bituminous trade continues very quiet. Deliveries are fairly good, and coastwise vessels are generally supplied with cargoes, as fast as they are ready for them.

The anthracite trade is quiet and unchanged. The business still continues remarkably good for the season, and there is no cessation in the preparation for winter, to which reference has heretofore been made.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

Major Powell once said, "The stage of the development of the human mind is measured by its capacity to eliminate the incongruous."

Every layer of rock forming a mountain range, like the leaves of a book, is usually written over, though in dim characters, like those of a faded manuscript, with history of departed ages.

The geologist whose ideas are not continually outrunning his observations will never go far in the science. He whose mind is behind his observations instead of in advance of them, will ever be mediocre. The minds of the leaders of geology are on the mountain heights before their feet have more than touched the foothills.

The dominant idea in Hutton's geological philosophy was that the present is the key to the past. We have grown so familiar with this idea, it enters so intimately into all our conceptions in regard to geological questions, that we do not readily realize the genius of the man who first grasped it with unerring insight, and made it the chief corner-stone of modern geology.

Nearly all objects in Nature can be seen, to some extent, without patience, and are pleasant even in being half seen. But the stone under a man's foot has for carelessness nothing in it but stumbling; and yet, do but give it some reverence and watchfulness, and there is bread of thought in it, more than in any other lowly feature of all the landscape.

Theoretically one electrical horse-power hour deposits from a gold chloride solution 5.7 lb. of pure gold, practically, however, only about 75 per cent of this amount.

Boring operations conducted by Russian Government engineers have discovered petroleum near Ferghana, a town on the Central Asian Railroad, in Russian Turkestan.

The discovery that a solution of cyanide of potassium dissolves gold without the aid of electricity is accredited to the Russian prince, Bagration, in 1843, and was made while he was investigating the Elkington process. His final conclusions sum up fairly well our general knowledge of the solvent action of cyanide on gold.

Elsner investigated the dissolving of gold and silver in cyanide solutions, and stated, in 1844, as the result of his researches, that it was owing to the action of oxygen. To the varied application of this important fact, a half century later, is owing in a great measure, the recent rapid development of the cyanide process.

Faraday's classic experiments in 1857 showed that gold leaf floating on cyanide solution and in contact with air dissolved about 100 times faster than when completely submerged in the solution.

Dr. Wurtz, in 1866, investigated the solvent power of dilute cyanide solutions, and made public his results in 1869. He is credited with the discovery that *weak* or *dilute* solutions of cyanide readily dissolve gold.

The first practical application of potassium cyanide as a solvent for gold is said to have been made by the Elkington Brothers, of Birmingham, England, in the year 1840, and in connection with an electrolytic gilding process.

Exhaustive tests seem to show that sulphate of aluminum is one of the best fire-proofing substances for wood, as it checks combustion by forming an infusible and non-conducting coating, while such substances as ammonium sulphate or ammonium phosphate when heated check combustion by emitting an incombustible gas.

A difficulty found in California is in transporting the heavy oils of the Kern River Valley. A pipe-line was recently finished from Bakersfield to a point on San Francisco Bay—a distance of 280 miles, with pumping engines 10 miles apart. When the line was opened, however, it took the thick Kern oil five days to travel 37 miles, and there was every prospect that still longer time would be taken to pass through the next 37. Heating the thick oil to 120° is to be tried; and the number of pumping stations is to be doubled.

The world's supply of aluminum is produced almost solely by the electric furnace. The processes used consist in the electrolysis of alumina dissolved in a molten bath of some other more readily fusible salt—generally the mineral cryolite, which is a double fluoride salt of aluminum and sodium, is used for this purpose. Theoretically 1 electrical horse-power day will produce 4.7 lb. of the metal, commercially, however, the output is only about 1.25 lb.

No workable process has as yet been discovered for producing aluminum by electrolyzing an aqueous solution of an aluminum salt.

We may look forward with hope to the day when it will be the rule that the workman is the partner with capital, the man of affairs giving his business experience and the workingman giving his mechanical skill, both being equally interested in the success of their joint efforts.

Experience seems to prove that a huge combination, or even a moderate corporation, has not a chance with a partnership which embraces the principal officers and adopts a system of the payment of a bonus or reward throughout the works. Such a partnership may be relied on to earn handsome dividends in times of depression, while the former, conducted on the old plan, would incur loss and perhaps financial embarrassment.

There are two attributes of which, as a people, we need to beware more than of any others—the arrogance which looks down on those not so well off, and treats them with brutal and selfish disregard for their interests, and the equally base spirit of hatred and rancor for those that are better off. Either spirit is utterly un-American and utterly alien to our institutions; utterly alien to the spirit shown alike by the men who founded this republic and the men who, under the lead of Abraham Lincoln, saved and perpetuated the Republic. The only principle upon which to act is in accordance with the immutable law of decency and fair dealing, to give each man a chance, to give one man the same Justice that you give to any other, to draw the line, not between one class and another on artificial grounds, not between rich and poor, but between the man who is straight and the man who is crooked without any reference to whether one be rich or one be poor. That is the only ground upon which you can afford to act.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the ENGINEERING AND MINING JOURNAL.

THE EFFECTS OF LABOR AGITATION.

The Editor:

Sir.—I send you a quotation from a letter written by a man who has been and is now a heavy investor in mining property. It shows more plainly than any amount of argument that the labor unions are doing themselves a great deal more harm than good by their incessant disturbance of industrial conditions:

"Labor conditions and prospects make us more anxious than ever to possess another good mining property, and when I get straightened out, believe I will redouble my efforts to find one. It is my present impression that Mexico offers more comparative inducements than ever before. Strikes have not yet become fashionable there, and I think are not likely to for many years to come. . . .

"Our present inclination is strongly toward removal of investments, as far as possible, from the field of labor disturbances and union organizations, and we have recently passed up some good manufacturing propositions in the States for this reason."

Suppose this man does buy a large mine in Mexico, then employment will be given to several hundred Mexicans which would otherwise be given to as many Americans. This is only one instance. I have personally known of the investment of about $5,000,000 in Mexican mines recently, and the deciding motive for nearly all of it was the freedom from industrial disturbances which is offered by that country.

Whenever one tries to show a workman that his union is doing him more harm than good, he points out the fact that wages have risen and working hours have been shortened since the advent of the union. Personally, I don't believe the unions had much to do with it. I believe the price of labor is governed entirely by the law of supply and demand, and I don't believe that the price can be kept on an artificial plane by a labor "trust." So far as I know every "trust" that has tried to maintain excessive prices on its commodity has gone to the wall. The best illustration of the fact, that the labor unions have had very little to do with the betterment of laborers' conditions, is afforded by the relative conditions on each side of the Sonora-Arizona line. Before the railroad was built to Guaymas, say, in 1875, the Mexican miners were paid about 25c. per day. They now get from $1.50 to $2, or seven times as much, on the average, as they used to get. On the Arizona side of the line there has been no material change. The miners used to get $4 a day, and put in a good, fair shift of 10 or 11 hours. Now the wages are from $3 to $3.50, but the working hours are shorter. It is true that the Mexicans are paid in silver and the Americans in gold, but inasmuch as all the necessaries of life, to the Mexican, are produced in Mexico, a silver dollar is just as valuable to him as a gold dollar is to the American, living on this side of the line. Had the unions done as well, no better, for their union men, as non-unionism has done for the Mexicans, the Arizona miners would be getting seven times $4, or $28, per day. Instead of helping our American workman they have helped the Mexican, for the American capital that was ready and willing to develop American mines and employ American labor has been driven from the home field by the unions, and has been forced to shed its blessings on a foreign land.

Mexico is not the only country that is benefiting by our reign of unionism. Wherever there are no union troubles, in China, South America and the remote parts of the earth, American capital is poured out in a golden stream to the everlasting benefit of those countries and the impoverishment of our own laboring classes.

GEORGE J. BANCROFT.

Denver, Colo., July 7, 1903.

MINE SAMPLING.

The Editor:

Sir.—The interesting series of articles recently published in this JOURNAL upon this subject suggest comments resulting from the writer's own experience.

In the first place it seems that the prospect pick should not be so summarily cast aside. In cases where the engineer is sampling small prospects, or must get along without an assistant other than a local helper whose sympathies are with the mine, it is possible with a proper use of the head and the point to get a fair sample. In the taking of check samples and for testing particular ore streaks it is very useful, if its weak features are borne in mind. The use of "pop shots" is admittedly unwise, but the flat cone resulting from their use is no more unfair than the numerous irregularities of face encountered in sampling. The salting of the dynamite is all but impossible, if the sticks are taken out of the original package and the miner has not been warned. Another point worthy of attention is the condition of the face to be sampled. This is very often dirty with mud, powder smoke, and dust. Aside from the actual danger of salting always possible with dirty faces, it must be remembered that the rich ore minerals of many deposits are brittle and the fines are very rich. Such material may give false values to a sample taken from a dirty face. If the ore be very hard the only way to get a clean face may be to use pop shots.

A word about the use of a box to catch the chips cut in sampling. If the ore be very hard it will fly off in chips, a considerable part of which will not go into the box; if soft streaks occur, all the material goes into the box. The result is an unfair sample. If a strip of canvas 20 ft. long be used and the width is sufficient to reach the sides of the drift, all the chips will be caught. There will be no danger of any one salting the sample by flipping in material, if the engineer follows the commendable practice of excluding everyone from the workings but his own men. The use of the canvas is also an advantage if the ore be spotty, since it is easy to cut a number of narrow grooves at close intervals, letting the material all form one sample.

In quartering down the sample it is not always possible or convenient to use the method described by Mr. Rickard, especially in the examination of small and remote properties. If the usual method of rolling the sample on canvas be used the fines will be more uniformly distributed, if the canvas be rolled by one person, taking hold of opposite corners alternately and rolling with the cloth close against the sample. Too often caution is not used to brush off the dust when the rejected quarters are removed. Personally, I find a piece of white enameled table oilcloth preferable to canvas in quartering down. It is quite as flexible and the glazed surface prevents material sticking, while the cloth can be had at any country store.

In marking samples some engineers carry small brass disks with numbers punched on them. If used at haphazard, and the number entered in the notebook, identification by other parties is impossible. If numbers are put on the outside of the sacks, do not make them consecutive.

In extreme cases, as in long trips in Mexico, where the samples cannot be under observation all the time, it is safer to use tin cans made and taken out for this purpose and sealed after filling.

When inspecting a mine it is both good sense and economy to make a preliminary examination, and to take samples at long intervals. Personally, I believe it is good practice to take samples of foot and hanging wall streaks, even where apparently barren, also of separate ore-streaks and lenses. It affords valuable information about the distribution of values and as to the advisability of sorting the ore. In my own experience I have found the waste of altered gneiss constituting the vein filling alongside of a vein of galena to be full of cobweb-like films of rich silver ore (pearcite), constituting better ore than the galena, and yet this had been thrown over the dump for some time. The discovery of the Camp Bird by Mr. Walsh was, he tells me, due to his recognition of the value of a similar condition but of different character. In another mine I found the hanging was an altered andesite containing pyrite and carrying $60 per ton in gold, while the recognized pay ore carried only $12 per ton. While it is true that the local miner generally knows the ore as well or better than the examining engineer, it is well not to follow the miner in his prejudices.

The valuation of a block of ore being based on assay results, it is well to consider how these results should be used. The common method is to multiply each assay value by the width of ore at the point where the sample was taken, adding up the resulting "foot-dollars" and striking an average, to be used with the tonnage of each block to give the total value. In still more accurate work, two assays are made of each sample, and these are averaged. Another way, and one which has given very reliable results, is to average the values of two adjacent samples and multiply the result by the average of the two widths of the vein; the product is to be used as the value of that particular part of the ore block; the result is quite different from that obtained by the first method, as will be seen below:

Width	2	(6)	10	(6.5)	3	(2)	1	(5.5)	10
Value .	$20	($11)	$2	($10)	$18	($14)	$10	($20)	$30

The average is $85, using the first method, and $67.25, using the last.

Dressing a mine for examination is easier than salting and more difficult to detect. If the ore occurs in bunches or small shoots it is an easy matter to carry up a stope as long as the ore is low grade, or the material is waste, and to stop work as soon as good ore is reached. In a certain Wood River property the mine was so well dressed that a reliable engineer figured that the ore developed was worth $450,000, and when it was worked it was found to be but $125,000. In a recent case a million-dollar property, with what appeared to be a safe margin of profit in the great blocks of ore developed, was shown by the work after purchase to have been similarly dressed for examination. The irregular workings of some mines and a lack of rectilinear development are likewise misleading. Where the workings follow irregular ore streaks an ordinary calculation is apt to give a wholly erroneous estimate of the ore developed. This is particularly true of Mexican mines, where the irregular workings follow the ore in utter disregard of any other consideration, such as economy of extraction or systematic development.

WALTER HARVEY WEED.

Washington, July 7, 1903.

DEEP LEVEL MINES ON THE WITWATERSRAND.

The Editor:

Sir.—The ENGINEERING AND MINING JOURNAL, dated May 2 last, contains an editorial entitled "Even Methuselah Died," in which, incidentally, reference is made to my book on "Deep Levels," and the subject of the probable value of the ore in the "deep-deep" region of the Main Reef is commented upon in such a manner as I believe calls for the notice of the "professional men who are directing the work on Rand."

The editor in this article charges me at the outset with avoiding "the awkward question of values at great depths," the correctness of which I, in a measure, acknowledge, my exact position in the matter being defined in the following extract from my work on Deep Levels:

" . . . The incontestable truths that for 42 miles on the line of strike there is practical continuity of the reef; that in all probability the existing line of outcrop forms to the original detrital edge the relationship of an immensely deep level; that the reefs and quartzites form inseparable parts of a whole which, as such, must be regarded as above any suspicion or doubt of continuity; that the present line of out-crop is only accidental on the plane it represents, and might easily, if acted upon by the same forces in another axial direction, have occupied a position corresponding to portions now very

remote from the outcrop; all these premises form strong links in a chain of evidence, favoring the assumption of the permanency of average conditions in the reefs themselves, which cannot be controverted.

"The writer, however, although optimistic as to the future, and although fully appreciating the infinite possibilities inherent in the 'deep-deep' zones of the reefs, cannot but realize that for the present any consideration of regions beyond the third row of deep levels would be premature, considering the enormous expenditure of time and money which the development of property within that limit would entail. The principal element of difficulty and uncertainty, in dealing with ground so far removed from present experience as properties distant four miles (if not farther) from outcrop, is our ignorance of the effect which the mighty outburst of igneous rock forming the Klipriversberg range has had upon the horizon of the quartzites and reefs of the Witwatersrand, and of the extent to which the reefs themselves have been affected by the ramifyin dikes and numerous faults which would accompany such an outburst. We are in ignorance, also, as to the distance from the eruptive margin at which the reefs may be so affected as to introduce conditions inimical to their economic value.

"It has been suggested that the probabilities are in favor of finding that the successive intrusions have so acted upon the reef in the very deep ground, that its depth from the surface (in the sections between intrusions) remains more or less constant. That such conditions exist is quite possible; and granting their existence, the writer holds that the tendency would be to form a series of synclinals, the anticlinal crowns being occupied by dike matter; and, further, that the movements engendered would result in such detailed faulting as to make the working of them (granting for a moment its feasibility) economically impossible.

"These are matters, however, which are outside the limit of the third row of 'deeps,' beyond which it is not proposed to venture in these pages, and they must therefore be relegated to the future.

"The Witwatersrand gold-fields proper may be stated to extend from the farm Randfontein, distant 21 miles from Johannesburg on the western side, to the farm Modderfontein, distant 21 miles from Johannesburg, on the eastern side, both farms inclusive, a total length of 42 miles."

This quotation clearly indicates what views are held by the writer on the question of values in the "deep-deep" levels, and for what reasons engineers do not hasten to deal with the question of gold content at remote distances from working mines.

Incidentally it might be mentioned that there is no necessity for immediate prophecy in connection with the "deep-deep" level values, that is, with values of ground in positions 8,000 ft. vertically from surface, indicated in the article under notice. It is realized that there is much to learn from the mines now in process of sinking on the second and third rows of deep levels, and that it will necessarily be some years before any general data from them will be available.

There is no present intention, so far as the writer is aware, to sink shafts even 6,000 ft. in depth, for the reason that there is such an enormous area of presently virgin ground on these fields, which lies within much shallower horizons, and consequently years will probably elapse before the question of the estimated value of ore lying 6,000 ft. vertically from the surface will become general, and by that time doubtless, workings will have been carried on so extensively in the 3,000 to 4,000 ft. zones, as to render prediction easy and natural.

The editorial in question, after traversing the results secured from various deep bore-holes, and calling attention to others so far obtained, states that although drill-holes are proverbially dangerous, nevertheless, in default of other evidence, their testimony must be heeded. I believe in the matter of bore-hole results the Rand has been peculiarly unfortunate, and it is generally known that had the original controllers of what are now known as the East Rand Proprietary mines, pinned their faith to bore-hole values—although these holes were all of shallow depths—the great gold producers now included in that group of mines would never have been developed. The Rand engineer now fixes the probable value of the ore in a "deep" section within reasonable distance from the nearest producing mines, taking all factors into consideration and regards the bore-hole as a pilot to locate the reef horizon in order that his subsequent operations may be facilitated and accelerated.

After treating of the bore-hole results and their bearing the writer of the article proceeds to state: "However, to us there seems to be a much stronger reason for scepticism concerning the un-interrupted persistence of pay ore, to such tremendous depths as those contemplated in the discussion on winding plant. All the experience of mining is dead against the supposition of a maintenance of values over any such extraordinary range of lode surface. Mines get poor sooner or later, just as surely as men grow old. Even Methuselah died."

The argument here adduced is one essentially born in the mind of a "lode" miner in the ordinary sense, that is, one who is inexperienced in the "extraordinary range of lode surface," which is included in the limits Randfontein to Modderfontein, a distance of 42 miles on strike, with the Nigel District, probably quite another 40 miles distant—measured on the outcrop run—as an outlier, which will one day be connected by—may be isolated—groups of producing mines with the present eastern terminal, namely Modderfontein, not to mention the possibility of extension of the present western terminal towards Klerksdorp.

The Nigel mines and the Modderfontein—Van Ryn mines form the opposite outcropping edges of a big synclinal basin, about 25 miles in diameter. In this basin many bore-holes have been sunk, and excellent results obtained in the farms Geduld and Cloverfield, at distances of 4 to 5 miles from the reefs outcrop. Having proved therefore the outcropping edges of the synclinal to be payable, and also having obtained payable drill cores from points intermediate and situated 5 miles distant from the southward dipping edge, there is some justification for the supposition that at least considerable areas of the total reef syncline will be commercially remunerative.

The Witwatersrand gold deposit is peculiar and cannot be gauged on ordinary experience. It is quite natural that the editor of the ENGINEERING AND MINING JOURNAL should cast doubt upon the continuity of its gold content, when his deductions are based upon experience obtained on other fields, and I wish to acclaim the spirit in which his article is written. I would at the same time, however, remind him of the evidences of continuity which the Rand engineer has before him in the deep level mines at the moment producing, in addition to the proof of payable ore in practically consecutive mines along a distance of at least 42 miles, and would ask if the evidences are not sufficient to build upon, in connection with the probability of meeting with payable ore at great depths. Also I would ask him if it is not a tribute to the caution of the Rand engineers that despite these remarkable and altogether singular attestations in favor of a general belief in the unchangeability of the average ore value in depth, they prefer not to forecast beyond certain limits of distance from present producing mines.

G. A. DENNY.

Johannesburg. Transvaal, June 19, 1903.

GEOLOGICAL SURVEY WORK.

The Editor:

Sir.—I was very glad to notice, in your recent issue, the tribute by Mr. C. W. Purington to the work done by the Geological Survey in Alaska. I have, in the course of the last three years, seen a great deal of the work of the Survey in that region, and wish to put myself on record as being one of those who have found it especially useful. Mr. Spurr's maps of the Kuskokwim Country saved me from a possible death in the mountains, as my Indian guide would have led us off to an entirely uninhabited section in the north, whereas, by my making use of Spurr's data, we were enabled to reach such civilization as Good News Bay afforded at that time. Up in the Seward Peninsula the same thing happened, and Messrs. Schrader & Mendenhall's work in the Copper River section has been verified by the numbers of mining men traveling in that section for the last two years.

The Survey's publication, "Contributions to Economic Geology," in the sections of which I have knowledge, seems to be a very useful compilation.

WEBSTER BROWN.

Seattle, Wash., July 6, 1903.

CANADIAN MINING INSTITUTE.

A circular from Secretary B. T. A. Bell gives notice that from July 1 the library and reading-room of the Institute are located at Orme's Hall, in Wellington Street, Ottawa, Ont.

We have referred to the unfortunate delay caused by the burning of the printing office, in which the volume of *Proceedings* for 1903 were nearly completed and ready for the press. As all the manuscript papers, and all the illustrations, were fortunately saved, the volume is now being reset, and it is hoped will appear at an early date.

THE JOHN FRITZ MEDAL.

The John Fritz Medal Fund Corporation has been organized under the laws of New York, the directors being J. James R. Croes, New York; Robert Moore, St. Louis, Mo.; Alfred Noble, New York; Charles Warren Hunt, New York; E. E. Olcott, New York; E. G. Spilsbury, New York; James Douglas, New York; Charles Kirchhoff, New York; Gaetano Lanza, Boston, Mass.; John E. Sweet, Syracuse, N. Y.; Robert W. Hunt, Chicago, Ill.; S. T. Wellman, Cleveland, Ohio; Arthur E. Kennelly, Cambridge, Mass.; Carl Hering, Philadelphia, Pa.; Charles P. Steinmetz, Schenectady, N. Y.; Charles F. Scott, Pittsburg, Pa. The officers are: Alfred Noble, president; Charles Warren Hunt, secretary, and C. Kirchhoff, treasurer.

There has been issued a pamphlet giving the certificate of incorporation and the by-laws, the most interesting article of which is that which relates to the Board of Award.

The regulations provide that the board of directors of the corporation shall constitute the board of award. Each shall hold its annual meeting on the third Friday of January in each year. By July 15, in each year, blank forms will be sent to each member of the board, in which he will insert the name or names of one or more persons as suitable candidates for the medal to be awarded the next year. These blanks must be returned by October 15, and all the names so presented shall be submitted at the annual meeting. Candidates for the medal shall be selected from these lists at the meeting, a vote of a majority of the members present being necessary for the selection. All the proceedings of the board are to be confidential, and no member shall have a right to reveal any of the names submitted, or the proceedings of the board.

DECOMPOSITION OF CARBON MONOXIDE IN THE REGENERATORS OF A SIEMENS-MARTIN FURNACE.—F. Wurtenberger, in *Stahl und Eisen*, 1903, XXIII, 448, and *Chemiker Zeitung*, XXVII (37), Rep. 119, reports the results of investigations as to the decomposition of carbon monoxide in the regenerative chambers of Siemens' furnaces. In the original furnaces of this type the gas was introduced through long iron pipes, in which it cooled to a low temperature. In the modern practice of placing the producers close to the furnace, it has been found that gas is lost by decomposition in the checker work. Investigations carried out at works in Sestri Ponente showed that about 22 per cent of carbon monoxide was lost by such decomposition. In order to avoid it the temperature of the checker work was carefully regulated, being kept at 1,000° to 1,050° C., but even then 12 per cent of carbon monoxide was decomposed. The decomposition occurs only when the gas pressure is cut off and a partial vacuum is formed by the chimney draft. This is prevented by working the gas producers at high pressure.

ACROSS THE SAN JUAN MOUNTAINS.

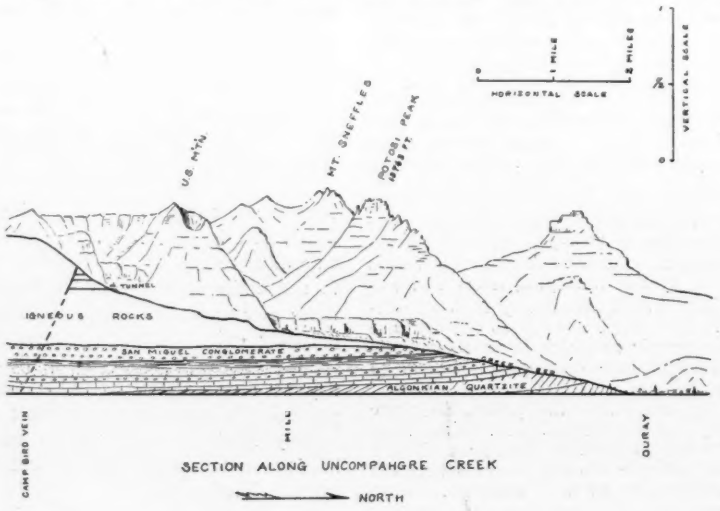
By T. A. RICKARD.

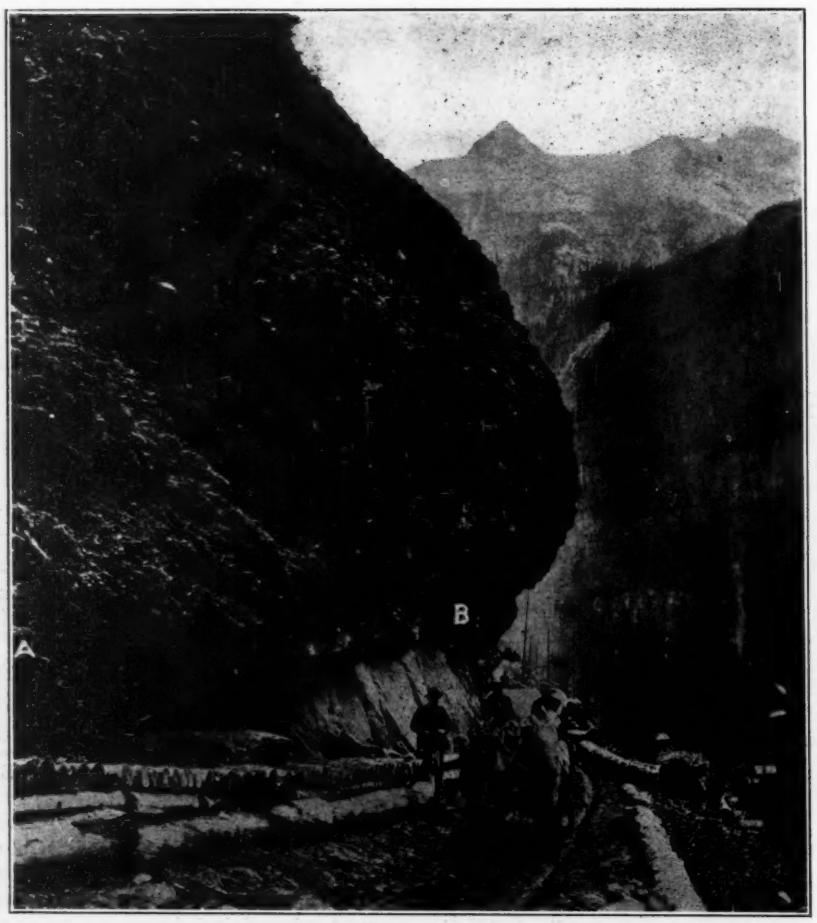
(*Continued from Page 46.*)

The next day, September 6, our cavalcade clattered up the main street of Ouray en route to Telluride by way of the Mt. Sneffels range. Cloudless weather, not unusual after the rains of late August, made the ride up Canon Creek to the Camp Bird mill a stimulating pleasure. Much of this road is cut out of the solid rock, in many respects it is a fine example of mountain engineering, and it is kept in good order because it serves as the avenue of traffic for two of the largest mines in Colorado—the Revenue and the Camp Bird. This part of Colorado owes much to an energetic little man who began by being an Indian interpreter, became a road builder and finally developed into a successful railroad organizer. Mr. Otto Mears is called the "Pathfinder of the San Juan"; he has left a monument as enduring as Thorwaldsen's lion of Lucerne, which lies sculptured in the rock above the Swiss Lake—and much more useful—for the roads which Otto Mears built into the sides of the cliffs that look down upon the Uncompaghre and its tributaries have contributed in a large degree to the successful development of some of the best mines in North America.

Mountain roads for heavy traffic should have a grade not to exceed 12 per cent, and a width of about 15 ft. On the typical American high road of today the cost of freighting by wagon averages 25 cents per ton per mile;[1] this rate is always exceeded when the grade exceeds 12 per cent; in the mountains the rate is often ten times as much because the loads pulled up the weary zig-zags are small compared to the horse-power employed. Thus, with four animals, averaging 1,250 lb. apiece, a load of 6,000 lb., distributed between the wagon and its contents, can be handled along an average mountain road at the rate of 1½ miles per hour. When the gradient exceeds 12 per cent it is more economical to pack, that is, to transport material by loading it upon mules or burros. The average cost of this method of transport is from 75 cents to $1 per ton-mile when there is no return load.

We overtook a train of burros with a miscellaneous freight of planks, groceries and boxes of dynamite destined for a small mine on Mt. Potosi; these, with bulky packages that hid their ears and left only a view of active extremities, looked at a distance for all the world like a migrating colony of Brobdingnagian ants.





A BIT OF GEOLOGICAL EVIDENCE ON THE ROADSIDE.

Advancing carefully along the *inside* of the road, whose outer parapet stood sheer over a precipitous cliff, we hurried our horses past the burro train and soon covered the six miles between Ouray and the Camp Bird mill, where Mr. W. J. Cox, the manager, gave us every facility for inspection. The mill contains 60 stamps, weighing 850 lb., with a drop of 6 to 8 ins., made 100 times per minute, and a resulting crushing capacity of 180 to 190 tons per day. The pulp passes through cloth screens of 26-mesh and No. 29 wire. It is then discharged upon silver-plated copper tables, which are the full width of the mortar, 54 ins., and have a length of 16 ft. The pulp then proceeds through classifiers, which distribute it among the concentrators—Wilfley and Frue vanners. The coarse material goes to vanners which have corrugated belts, the finer pulp goes to the plain belted vanners, and the slimes pass on to the Wilfley tables. Experiments were being made in the use of a 5-ft. Huntingdon mill for re-grinding the coarser sands. This is likely to prove suggestive. The tailings are delivered to the cyanide plant, and are pumped into vats, having a capacity of 275 tons apiece, where they undergo solution for nine days. Tests were being made by Mr. Godfrey Doveton, who had charge of the cyanidation, with a view to determining whether the Johnson filter press cannot be advantageously employed in the treatment of the slimes which overflow from the tanks; at present the press is only used in connection with the precipitate from the zinc boxes. In West Australia the large filter presses have a capacity up to 6 tons apiece, with a tendency to increase. They were found to expedite the treatment of slimes and to economize water. All experiments made in this direction should be useful because they point to a great economy of time and labor.

The Camp Bird ore is one of the most docile. The total extraction of gold is fully, sometimes more than, 90 per cent of the assay returns from the crude ore. The latter carried about two ounces in gold at the time of our visit; the concentrates represent about 10 per cent in weight and 20 per cent of the value of the original ore, they contain 9 to 12 per cent lead, 12 to 15 per cent zinc, 14 to 16 per cent iron and 20 to 22 per cent silica (as quartz). They also carry from 2½ to 4 oz. of gold and from 11 to 15 oz. of silver per ton. They are sacked and sent on mule-back to Ouray, the charge for transport being $2.50 per ton—for the six miles of down grade. Coal is brought up as return freight at a cost of $4 per ton. The concentrates are then sent over the range, via Marshall Pass, to the Denver smelters, 388 miles distant, at a cost, for transport, of $7.50 per ton and a charge, for treatment, of $7 to $8 per ton. The bullion, resulting from amalgamation and cyanidation, is sent under escort every day to Ouray, whence it is sent through an express company to the mint at Denver.[2]

After partaking of Mr. Cox's hospitality we mounted again and began the ascent to the Camp Bird Mine in Imogene Basin. As we surmounted the first rise we found ourselves in a wide amphitheatre of serrated ridges with a broad gap in the direction whence we had come. Looking backward down Canon Creek one could not fail to observe the fact of a succession of geological formations on account of the variations in the color of the rocks. The road from Ouray first cuts through a gray ridge of Silurian limestone, then passes over reddish beds of Upper Carboniferous lime and shale which, in turn, are unconformably overlaid by a Tertiary conglom-

[1] Mr. Jas. W. Abbott tells me that in European roads the cost ranges from 6 to 13c. per ton mile, with an average of about 10c.

[2] Since the date referred to an excellent account of the Camp Bird mill and mine has been prepared by Messrs. Purington, Doveton and Woods. See *Transactions* American Institute of Mining Engineers, 1902.

erate whose nearly horizontal bed has a wide extent throughout the adjoining mining district of Telluride. This "San Miguel Conglomerate," as it is called, has a particular interest because it lies at the base of a great series of fragmental volcanic rocks (chiefly andesite-breccia) and lava flows which enclose the majority of the important mines of the region. This series is called the San Juan formation. The road intersects the base of the series a short distance below the Camp Bird mill at about 9,100 ft. above sea level, as is shown by the accompanying photograph, where A B marks the line of separation between the two formations. Our trail continued to pass over successive layers of the breccia and its intercalated flows of lava until we reached the summit of the range, at 13,800 ft. When a mine is situated in this country of andesitic breccia the distance separating the deepest workings from the sedimentary rocks at the base of the San Juan formation becomes a matter of practical importance because experience warrants the expectation that an impoverishment will be encountered when the vein passes out of the volcanic series. The Camp Bird lower tunnel, for example, is about 2,100 ft. above the San Miguel conglomerate so that there is plenty of room for further downward development. A generalized section of the geology and topography is given in the accompanying sketch, which I have borrowed from Mr. H. A. Titcomb's article in the Columbia School of Mines Quarterly, of November, 1902.

The Virginius, a neighboring mine, has an adit—the Revenue tunnel—which strikes the vein at a point 2,400 ft. below the outcrop and 10,800 ft. above sea level. The conglomerate is supposed to be about 1,000 ft. deeper. A shaft has proved the vein for 900 ft. below the adit so that the total exploration on the vein extends for a vertical height of 3,300 ft., which is the deepest development attained by any mine in Colorado. The Virginius vein is remarkable in other respects also. It has been worked for more than 20 years. For the first 400 ft. in depth the vein was stoped continuously, although its width only ranged between a finger and a hand's breadth. The ore was chiefly gray copper—argentiferous fahlerz—and averaged 400 to 600 oz. silver per ton. At about 1,200 ft. down the shaft, which followed the vein, entered a poor zone, which extended for 300 ft. further. At the level of the Revenue adit[3] another poor zone, about 150 ft. thick, was encountered. The new vertical shaft, sunk from the adit, has found good ore, 30 ins. wide, at 550 ft. The Virginius, by the way, has a large electric installation which operates both mine and mill. The electric cars used for underground traction are remarkable in taking the high pressure of 800 to 900 volts from a bare wire placed about the height of one's head. The power is generated from a succession of Pelton wheels, which use the water of Canon Creek. They present an interesting feature in the fact that the nozzles are worn out in ten days by the action of sand at high velocity, which is the consequence of using a stream charged with tailings from a mill.

On arrival at the Camp Bird the superintendent, Mr. William Beaton, piloted our party through a portion of the workings. Both Mr. F. L. Ransome and Mr. C. W. Purington have recently described this lode in detail.[4] A production, up to date, of about $7,500,000 places the Camp Bird among the great mines of Colorado. It is also interesting as having been until lately the porperty of the man who opened it up, Mr. Thomas F. Walsh.

The history of the discovery of this celebrated mine is curious. The only outcrop on the vein for several thousand feet is in a small gully right at the head of Imogene Basin. A claim was located on this outcrop in 1877, but nothing further was done, because no ore of any value was exposed at this point. William Weston and George Barber, who were the owners, made a proposal to H. W. Reed and Caleb Reed that if they would run a cross-cut tunnel, which would cut the vein at about a depth of 150 ft., they could have the option of locating a new claim on whichever side of the cross-cut they chose. The cross-cut was run, and in due course intersected the vein. The Reed Brothers drifted 50 ft. to the west and took up a claim on that side. This was then patented under the name of the Una claim. On the eastern side the Gertrude claim was pegged out by Weston and Barber who, later on, sold it to the Allied Mines Company. This was in 1878. Subsequently the company extended a drift for 40 ft. into the Gertrude ground, but found no ore of any value; later still, another 10 ft. was driven, so as to make the distance 50 ft., and thus qualify for patent. This was in 1884. The ore in the last 10 ft. was *not* assayed because the work was only done to fulfil legal requirements and the first 40 ft. of the drift had carried no pay ore. But as a matter of fact the drift had, in the last 2 or 3 ft. broke into rich ore; it remained there undetected until 1896, when Walsh broke some samples and had them assayed, thereby taking the decisive step toward becoming a millionaire. Moral: Never fail to test the ore of a drift which is penetrating into new ground, and never assume that ore is poor because it looks like ore you know to be poor.

The rest of the story is well known. Walsh was an experienced miner who had met with some success both at Leadville and Rico. In 1896 he was manager of the pyritic smelter erected at Silverton for the treatment of the ores sent down from Red Mountain by the Yankee Girl and Guston mines. Walsh had, in 1894, organized the company which put up this plant. In the search for siliceous ores he investigated the mines of the surrounding country, not only those in operation, but also the aban-

CAMP BIRD CYANIDE PLANT. LOOKING UP CANON.

CAMP BIRD CYANIDE PLANT.

CAMP BIRD MINE, NEAR OURAY, COLORADO.

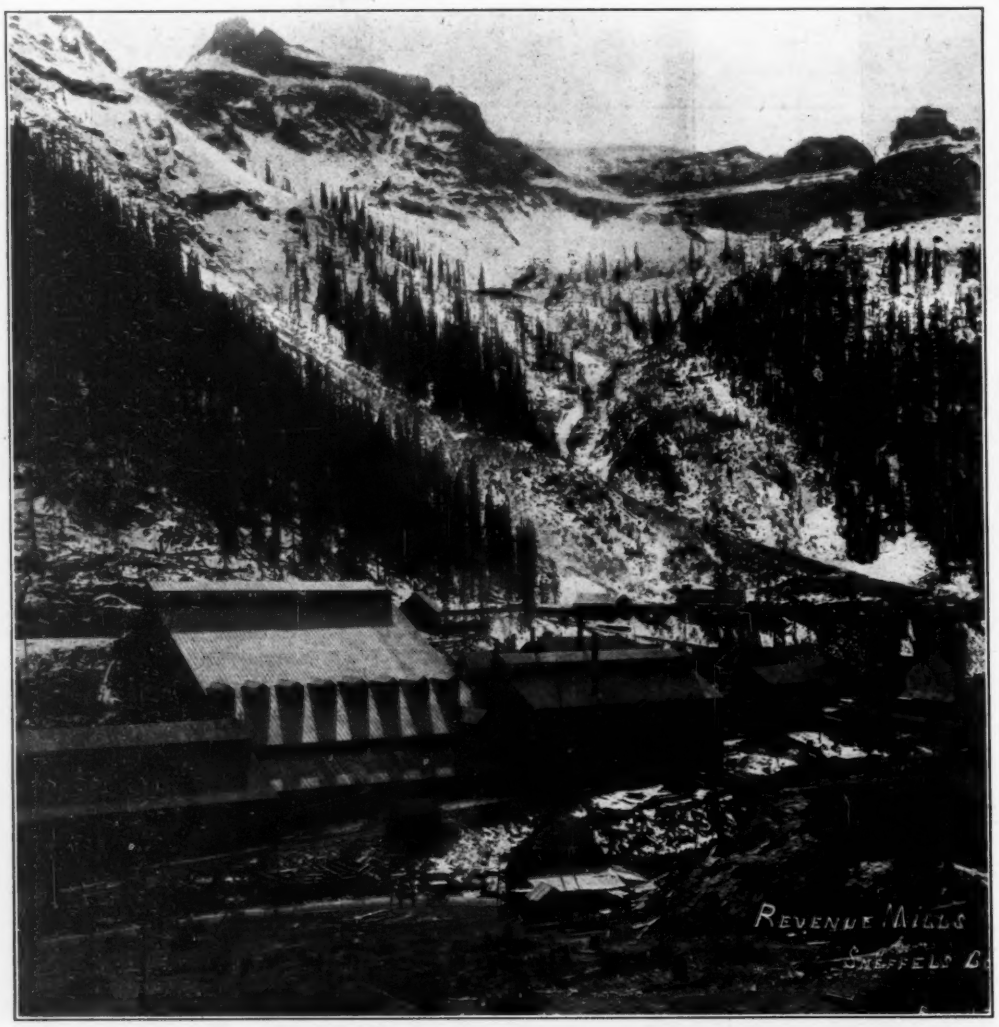
[3] It is a pity that the word "tunnel" is so often misapplied. In the above case, and ordinarily in mining, the word "adit" should be used. A tunnel is a gallery or working which reaches from daylight to daylight, like a railroad tunnel. A main crosscut or level which connects a mine with daylight is an adit.

[4] *Bulletin* No. 182. United States Geological Survey, p. 89-90 and 200-204 and *Transactions* American Institute of Mining Engineers, May, 1902. Also ENGINEERING AND MINING JOURNAL, May 30, 1903.

doned prospects. He acquired the Hidden Treasure Mine, in Imogene Basin—this was a low-grade silver-lead property, which has never done much. In July, 1896, he went to see how work was going on at the Hidden Treasure and incidentally he noticed some pieces of pink spar amid the debris scattered at the foot of the cliffs, which form the upper limits of Imogene Basin. This pink spar he took to be fluorite, and because it reminded him of Cripple Creek, where also he had mined with some success, he made a mental note of the occurrence. In the following September he revisited the locality and climbed up into the old Gertrude adit, from which he inferred the pink spar to have come. It was rhodochrosite; but no matter. It led him to take samples at the breast of the east drift. They were sent at once to Ouray to be assayed. The returns gave several ounces of gold per ton. More samples were taken and sent to Leadville for assay. The results were confirmatory, so he went to work quietly and began the steady consolidation of the adjoining property. Mr. Walsh's success was the reward following many years of most energetic search, a search backed by unusual experience in mining and extending over a large area which contained a great number of deserted old workings likely to prove remunerative under new economic conditions.

The main level of the Camp Bird is now over a mile in length, so that when we emerged from underground it became necessary to make haste in order to cross the range before dark. Ouray is 7,806 ft. above sea level, the No. 2 level of the Camp Bird is at 11,510 ft., and the place where the trail crosses the divide is at an altitude of about 13,800 ft. The trail is a good one in summer, so that we did not require to lead our horses save in the steepest portions of the rise and in the abrupt descent on the other side. When we attained the summit a halt was called in order that we might take in the splendid panorama of mountains which lay outspread on either hand. Looking back over the course we had traveled we could see the shadows hastening to cover the valley of Canon Creek and the sheltered corner among the hills where Ouray lay concealed; in the far northeast the dark mass of the Uncompaghre plateau loomed purple in the fading light. Looking the other way the grim desolation of time-worn summits and crumbling crags reached down into the gloomy gorge of the San Miguel which suddenly broadened into the sunlit valley of Telluride, checkered with cultivation and bright with the gleam of blue water. Beyond were green foothills out of which arose the sculptured mass of Mt. Wilson, silhouetted against the setting sun, and further still northwestward rim upon rim of far-off hills fading into the bourne of distant Utah.

(To be Continued.)



REVENUE MILLS, MT. SNEFFELS, COLORADO.

THE HEAVIEST RAINFALL.—According to a correspondent of the London *Standard*, the annual rainfall on the Khasia Hills, to the northeast of Calcutta, amounts to some 600 in., 500 in. of which fall in seven months, during the southwest Monsoon. It is undoubtedly the wettest spot on the globe. As many as 150 in. have been registered in five consecutive days, or an average of 30 in. a day. This astonishing amount is due to the abruptness of the mountains which face the Bay of Bengal, from which they are separated by 200 miles of low swamps and marshes.

WATER POWERS OF THE WORLD.—An estimate of the water powers developed in the several countries was given by A. Gradenwitz, in a paper before the Frankfort Congress of German Naturalists. His figures are as follows: Germany and Austria, 180,000 h.p.; Switzerland, 160,000 h.p.; Sweden, 200,000 h.p.; the United States, 400,000 h.p. He estimates the total power available in a number of countries to be: Sweden, 2,000,000 h.p.; France, 10,000,000 h.p.; Germany, Austria, Switzerland and Italy, together, about 10,000,000 h.p.; while in the United States 10,000,000 h.p. could be furnished by Niagara Falls alone.

MINING IN SOUTH AFRICA II.—THE DEEP LEVEL PROBLEM.

By J. H. CURLE.

It is assumed by people interested in the Transvaal mines that the conglomerate beds, which have an average dip of about 30°, carry an unvarying gold value throughout—a rich bed continuing rich over its whole area, and a poor bed continuing poor. It is therefore assumed that the Main Reef series, which contains the richest beds, and which is known to carry long stretches of good ore to a vertical depth of at least 2,000 ft., will still prove equally good at the greatest depth to which mining is possible. Thus, while the deepest shafts in the world to-day, those of the copper mines at Houghton in Michigan, are a bare 5,000 ft., we see engineers on the Rand gravely discussing shafts which are to make light of 6,000 ft., and which, being then turned on the incline, may eventually reach 10,000 or 12,000 ft. vertical.

Surely this is beginning at the wrong end. I want to know, both as a miner and a would-be investor, whether the ore is going to be payable at 3,000 or 4,000 ft.—let alone 6,000 or 10,000—and it will take more proof to convince me than has yet been furnished to anyone. To begin with, why should this conglomerate bed carry payable gold to such extreme depths? I can't profess to tell where the gold has come from, but, whatever its source, is it not likely to be subject to the laws which affect metal deposition elsewhere? The metal deposits, whatever their geologic structure, which carry undiminished values to even 3,000 ft. vertical, are few in number, and I could not name one anywhere that might be expected to be profitable at 6,000 ft. Why, then, must we implicitly accept the Rand's value at a great depth as being a foregone conclusion? I grant that in places it has already been proved payable at 2,000 ft., or even deeper than this, but the favorable evidence at this depth has to be set against much that is not favorable, and rather ominous. The Rand conglomerate is the greatest discovery of gold ever made, and its more or less proved value to 2,000 ft. or so opens up wonderful ore reserves; but may we not have already exposed the richest part of the bed, and may not that richer part be due to secondary enrichment of some sort?

An "outcrop mine" on the Rand is one working the conglomerate bed down to a vertical depth of about 1,000 ft. To this depth the ore always maintains a fairly regular value. Below these mines come the first row of "deep levels," which work the bed from about 1,000 ft. to, say, 2,500 ft. vertical. A number of these mines are now at work. They show ore of nearly as high value as that worked by the "outcrops." It might, I think, be shown that the "first row deep" mines are not quite so rich as the "outcrops," perhaps by 10 per cent. So far as I know, speaking from memory, their average yield is about $1 a ton less, and it must be remembered, too, that only the deeps of the richer outcrop mines have as yet been opened. It must be pointed out, too, that only the upper sections of these mines are as yet being worked. I am not prepared to say that the ore at 2,000 ft. vertical, that is to say, in the lower part of the mines, is so good, striking an average all along the Rand, as it is at 1,200 ft. Regarding this point there is not sufficient evidence at hand yet to state definitely.

The "second row deeps" own that section of the bed lying at a vertical depth of between, say, 2,000 or 2,500 ft., and 3,500 or 4,000 ft. Here we come upon facts as to ore-values which, to say the least, are contradictory. There are a number of second-row deeps, but as yet only five have their shafts down to the reef, and only one is producing. These mines and the evidence they furnish as to ore-values I will summarize thus:

1. *Robinson Deep.*—Two vertical shafts, averaging 2,095 ft. From the bottom of these incline shafts are sunk, and a number of levels opened up. The

ore mined may be said, therefore, to come from an average vertical depth of 2,300 ft. Up to the time war broke out, 200,000 tons of ore had been treated, averaging about $12.50 recovery. But this mine is under the richest section of the Rand, and its average value, assuming that there is no falling off in grade with depth, should be at least $5 a ton more. Of course, this is a fine mine, and when producing with 200 stamps will earn big profits; but the question at issue is to determine whether there is a falling off in value with depth, and this seems to be the case.

2. *Village Deep.*—Adjoining Robinson Deep. One shaft, 2,200 ft. deep, is down, and the small amount of development done to date has exposed good ore. This is also in the richest section of the Rand.

3, 4 and 5. *South Rose Deep. Simmer East. Knight Central.*—These three mines adjoin each other and lie under "outcrop" and "first row" mines which contain a good average value of ore. Their shafts average 2,100 ft.; but in this section of the Rand there is a big step fault, throwing up the beds 1,000 ft., so that their ore represents a vertical depth of really about 3,000 ft. In these three mines a good deal of development has been done. In each case the ore is of lower average value than in the corresponding "outcrop" and "first row" mines. Some of it, of course, is quite up to the average, but there are large patches in each mine that show unpayable ore, thus lowering the average of the whole. There is no doubt that in each case these mines are poorer than those above them, poorer than they were expected to be, and the original calculations as to their profits will have to be re-adjusted.

Now, *that* is not very good news of the "second row" deeps, nor is it reassuring as to the value of the Rand below 2,000 ft. It is, of course, inconclusive evidence, as compared to what we will know in a few years, but it is quite enough to make one resolve to go carefully. After this evidence of shafts, and development work done in ore, I will ask the reader to look at the results of the bore-holes put down to a greater depth than 2,000 ft. Since the war there has been a great deal of drilling, and results are coming to hand every week. I cannot claim for the list of bore-holes I give, absolute accuracy, for I am writing this in mid-Atlantic, where official sources of information are not obtainable, but I do not think it is seriously in error.

Statement of the deepest boreholes on the Rand.

	Name.	Depth in feet.	Widths of ore in inches.	Value in dollars.	Remarks.
1	Turf Club	4,845	20	6	Main Reef series. On dip of richest section. Proves regularity of beds, but indifferent values.
			6	64	
			34	6	
2	Turf Club	4,825	43	10	
			45	8	
3	Angelo Deep	3,783	36	4	
4	Angelo Deep	....	..	..	Figures mislaid by me, somewhat similar results.
5	Rand Collieries	3,520	34	11.7	
6	Cinderella Deep	3,309	49	9.1	
7	Bezuidenville	3,251	..	..	Figures mislaid—very poor value.
8	Tudor	3,214	..	..	Disturbed country—no ore.
9	Transvaal Coal Trust	3,200	..	..	Disturbed country—no ore.
10	South Rand Deep	3,169	3	23	
11	Welgedacht	3,090	38	..	Value not yet stated.
12	Cloverfield	2,975	4	20	Some of the core lost.
13	Modderfontein Deep	2,803	12	15.5	
14	Modderfontein Deep	2,781	..	..	Disturbed country—no ore.
15	Transvaal Coal Trust	2,617	..	..	Disturbed country—no ore.
16	Tudor	2,253	3	14	
			60	1	
17	Rand Nucleus	2,246	4	13.5	
18	Geduld	2,136	14	17	

We cannot, even with the wildest stretch of imagination, call these results favorable, especially taken in conjunction with the big depths. On the other hand, it would not be fair to base too much, either for or against, on the evidence of bore-holes. I submit the figures for inspection of mining people in America, but do not consider them of supreme importance as bearing out my argument. Curiously enough, if we included all the bore-holes, ranging between 1,500 and 2,000 ft. deep, we should find much better results, for quite a number of these—including some on the outlying portions of the Rand, both far East and far West—have yielded cores showing good ore. These bore-holes have opened our eyes to the immense quantity of payable conglomerate which probably exists to at least 2,000 ft.—even in places where the outcrop has not yet been worked—but the evidence of good ore at really great depths is so far absent.

The foregoing, I think, summarizes all we know about the Rand at depth. On such evidence I should be inclined to go very cautiously. When, therefore, I hear engineers talking about working at 6,000 ft. or deeper, I feel inclined to say to them: "Gentlemen, why this haste? Have we even yet mastered the problems which the Rand is likely to present at 3,000 or 4,000 ft? And is it certain that capital will be forthcoming for your ambitious schemes?"

In the deep level problem the money question is of the greatest importance. It is well known that the "first row" deeps cost on an average over $2,500,000 in equipment before they were ready to produce. The "second row" mines are going to cost a good deal more than this; and Mr. Denny, in his book, estimates that a mine 6,000 ft. deep will need a working capital of $5,000,000. There are lots of areas floated off where the reef lies at from 5.000 to 7,000 ft. deep, but how the proprietors are going to raise these large sums of cash to equip them, I cannot see. The powerful financial houses have already got their hands more than full. Even they will have much difficulty in financing their mines lying at 2,000 or 3,000 ft. When one realizes the immense sums that have yet to be found to develop and equip the Rand down to even 4,000 ft., the chances of the still deeper mines, from the financial point of view, seem to fade away. I wonder if all the Rand engineers realize the naked truth about this money question?

Why should the public rush in eagerly to finance these schemes? I don't think the inducements offered are sufficient. To begin with, there is the uncertainty connected with any mining venture. Secondly, they are not offered the shares at par, but usually at a premium of several hundred per cent, and, thirdly, there is the long time which must elapse before the mines can produce. These proposed very deep mines, say, with shafts from 4,000 to 6,000 ft. deep, will take from six to eight years to reach the producing stage; that is, if they are started at once. But they are not being started. Areas floated between 1895 and 1899, with big nominal capitals, and shares at a high premium, have never yet even started shaft-sinking. These mines cannot produce before 1910. By that time the shareholders will have been without interest on their investments for 10 or 15 years, thus doubling the original cost of the shares to them. And if at the end of that time the ore turns out to be worth perhaps $8 or $9, showing only a small profit, the market value of the shares will sink away seriously.[1]

PSEUDOMORPHS OF GEOLOGY.

The following remarks were made in London, at a meeting of the Murchison Associated Company, Limited, by a mining engineer who addressed the shareholders:

"There is one thing that has got to be borne in mind in Western Australia. At one period they had hypothermal springs existing in that country in almost every reef that was there. This hot water was there at the time the reef was cooling, and the decomposition of the pyrites brought up the gold from the natural water-level, and deposited it in the surface, giving the rich deposits which have been found on the outcrop. You therefore have to get past the poor zone thus left underneath before you get your permanent reef."

Geology has to play many parts, some of them comic. It is a serious thing, however, when a man calling himself a mining engineer can get up at a public meeting of shareholders and talk such drivel without correction. The extracts indicate that these "delirious trimmings" of geology are made to do duty both ways, at one time to explain the richness of the outcrop and the poverty of the deeper levels, at another to hold out the hope that the deep zone of the mine will be richer than the shallow horizon. It is nonsense masquerading as science.

ON ADOBE AND OTHER MAKESHIFT FURNACES.*

By HENRY F. COLLINS.

(*Continued from Page* 51.)

The author, when resident in Mexico, on several occasions employed a furnace practically identical with that shown in Figs. 6 to 8[1] to smelt copper bottoms left to him as a legacy by predecessors inexperienced in the handling of furnaces. The furnace was in the first instance built round the largest of the bottoms, which was jacked up for the purpose of putting in a hearth, and then let down into position and surrounded with sand formed to the desired curve to make a center for the arch, the sand being subsequently removed through the working door. As soon as the furnace was completed, a small fire was lit in the ash pit to dry it out, and, after two days' drying, the fire was increased until the interior of the furnace began to approach a red heat. The tap-hole was prepared by tamping in a large ball of well-tempered clay, through the center of which was driven a 3-in. pole of pine tapered to a long point, which was allowed to remain in the hole. The working door was then clayed up, except a small eye-hole closed by a plug, and the fire urged by feeding with selected dried brushwood, until, after about 12 hours' brisk firing, the whole mass melted down. The moulds being got ready, and the first placed in position—in this particular case square pig-copper moulds on wheels were available—tapping was effected by pulling away the pole, which readily snaps off from the carbonized plug remaining in the hole, and driving a light steel bar through the latter.

Other masses of bottoms were subsequently charged into the furnace by simply taking down the arch and one side wall and laying an incline of heavy plank up to the hearth, up which the bottoms were removed by means of blocks and rollers.

The amount of clean pig-copper obtained at one melting varied from 15 cwts. to 1 ton; the total cost of each melting worked out at from 75c. to $1 per cwt. of metal recovered.

Furnaces of this kind having been often successfully employed for reducing high-grade silver ores, could also be used in case of emergency for treating, upon a lead bath, sulphide precipitates from lixiviation works, and it has even been suggested that they might be employed, in very out-of-the-way localities, for reducing low-grade precipitates from the zinc-boxes of cyanide works. In view, however, of the high losses inseparable from such rude appliances, due not only to dusting and to foul slags, but in even greater degree to absorption in the large amount of waste furnace material, which has constantly to be torn out in order to effect repairs, and cannot in practice be all worked up again without loss, the author would deprecate all attempts to use *adobe* or stone as material for the construction of any furnace to be

[1] Frankly, I don't believe in the economic value of conglomerates at a great depth. I think it is open to doubt whether, on the Rand, $8 ore could under any circumstances be profitably worked at 6,000 ft., and I should like Mr. Rickard to start a discussion on the subject.—J. E. C.

* Abstracted from *Proceedings* of the Institution of Mining and Metallurgy, London, June, 1903.

[1] Figs. 1-8 will be found in the previous article, in the issue of July 11.

utilized for handling such high-grade products. When one is dealing with material of such value as zinc-box precipitate, or even as sulphide precipitates from the lixiviation process, it will always pay to import firebrick at almost any cost to build furnaces, so as to minimize as much as possible the wear and tear on the furnace and the losses of precious metal.

In the Sierra Mojada and Catorce districts of Mexico, a reverberatory furnace with steeply inclined hearth, called a *serpenton,* was formerly employed for smelting rich lead ores to argentiferous lead, and a slag containing over 30 per cent of lead, which was set aside for subsequent treatment in blast furnaces. The inclined hearth of these furnaces measured about 12 ft. long by 2 ft. wide, and the ore was charged at the top of the incline and gradually moved downward to the sump behind the fire-bridge, from which lead and slag were tapped off. The working of the furnace was thus continuous, and its capacity was very much greater than that of the plain reverberatory furnaces already described, while the cost both for fuel and labor was somewhat lower.

The daily capacity ranged from 3 to 6 tons of ore,

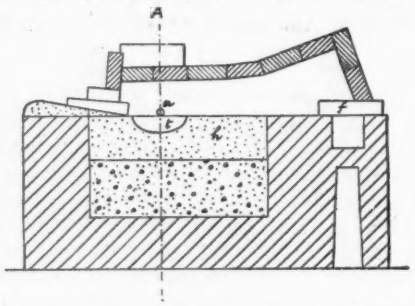


FIG. 9.—Longitudinal Section through C D.

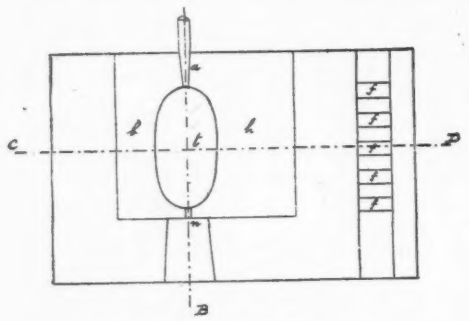


FIG. 10.—Plan on Tuyere Level.

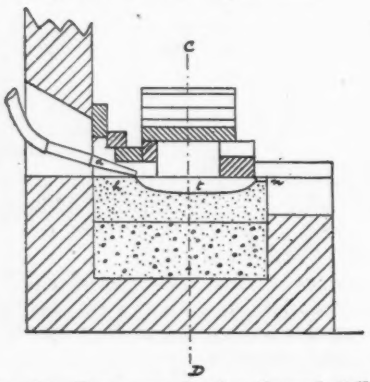
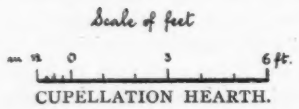


FIG. 11.—Transverse Section through A B.



CUPELLATION HEARTH.

and an average figure of cost would be from $8 to $10 per ton. The ores treated in *serpentones,* however, were only the most easily reducible carbonate lead ores, as the construction of such a furnace does not lend itself to the treatment of dry silver ores upon a lead bath, for which the furnace previously described is suitable.

Cupellation Furnaces.—Cupellation of argentiferous lead in the Mexican *vaso* or hearth, has been so well described by W. L. Austin[3] that the author need do little more than summarize the details there given, in order to complete the description of *adobe* furnaces of all the different varieties which have been in extensive use in different parts of Mexico. Figs. 9, 10 and 11, reproduced for convenience from those which appear in the second of Mr. Austin's papers, show a *vaso* of slightly larger dimensions than those which the author has seen in common use in several mining camps, but of exactly similar construction. It is built entirely of *adobes,* at a cost of about $15. The fuel employed is scrub-oak wood in small sticks, or any kind of brushwood; it is placed upon the *adobe* firebars marked *f*. Blast is supplied from an ordinary forge bellows through the tuyere *a*. The test *t* is cut out from the hearth *h,* composed of a mixture of (by measure) 2 to 3 parts of hardwood ashes to 1 part of clay, well rammed into a space about 3 ft. square left between the *adobe* sidewalls. The roof of the furnace is not arched, but is built simply of *adobes* of extra large size (27 to 30 ins. long, and 11 to 12 ins. wide and 3½ ins. thick) resting upon others standing on edge, which form the side walls. All the joints between the *adobes* are carefully luted with clay and re-luted as any cracks appear. The total cost of building such a furnace in Mexico, under favorable circumstances, is only about $15, which includes about $3 for the *adobes,* and $12 for labor; clay and water are supposed to cost nothing.

After forming the test a small fire is built upon it, and along the whole length of the hearth under the arch, as well as in the fireplace. When heated up the ashes are all raked off, and more fuel being added in the fireplace alone, the pigs of lead are piled upon the inclined hearth at *b,* and gradually melt down. The hearth holds about 300 lb., and when it is full the blast is turned on, litharge as it forms being allowed to run from the notch *n* opposite the tuyere, while more lead is added at intervals at *b* and melted down. When the silver upon the test amounts to 80 or 100 lb., the furnace is allowed to cool sufficiently for it to set, one of the *adobes* from the flat roof is removed, and the cake of silver is lifted out and cooled in water. The test is then patched if necessary, the roof repaired, and another campaign begun.

The capacity of such a cupellation hearth varies somewhat, with the quality of fuel available, but may be reckoned at about one ton of lead per 24 hours when fairly good scrub-oak or pine wood is procurable. Two men are required on each shift, and the cost per 24 hours or per ton of lead may be reckoned at, say, $3 for labor, $3 for wood, and $1.50 for furnace repairs, blast, and other incidental expenses, making a total of, say, $7.50 per ton of lead. The loss of lead by volatilization is from 10 to 12 per cent, the remainder being recovered as litharge which can be used for smelting dry ores in one or other of the kinds of ore-furnaces previously described.

It will be seen that by the combination of this simple cupellation hearth with the equally simple reverberatory furnace already described, silver ores containing not less than 30 to 40 per cent of lead can be reduced successively to pig lead and to metallic silver by the aid of no fuel other than brushwood, and no other materials than common clay and a little refractory stone—which can be dispensed with if absolutely necessary—while the most unskilled labor can be trained, to perform the few simple manipulations necessary. The lead not volatilized would all go in slags and could not be utilized without a simple blast-furnace. Given, however, wood of sufficient size to burn into charcoal, the slags could be run over again in a blast-furnace similar to that shown in Figs. 1 to 3, and would yield a portion of their lead contents as pig lead, the value of which, however, in isolated districts to which the practice herein considered is applicable is generally nothing or very small indeed.

On the other hand, the use of a blast-furnace instead of a reverberatory, enables ores of a more refractory nature to be treated; and, seeing that the litharge from the cupellation hearths is all returned to the ore furnace, renders it possible to treat successfully ores containing as low as 20 per cent of lead, providing the gangue is ferruginous.

[3] *Transactions* of the American Institute of Mining Engineers, vols. xii, p. 185, and xiii, p. 41.

THE WACHWITZ METAL PROCESS.—A new method of preparing sheet metal is being exploited in Germany by the Deutsche Wachwitz Metal Company, which has a factory at Bersbruck, near Nuremberg. The process consists of a simple method of heating two metals together in ingots, which can then be rolled out to any desired thickness, down to foil. It is claimed that the metals lose nothing of their inherent ductility, and that they can be combined in any proportion. The output of the German works at present consists of copper-plated steel and copper-plated zinc sheets to be used especially for roofing. The Central Station at Nuremberg, now in course of erection, has been roofed with the copper-plated zinc sheets. Other products are aluminum plated iron sheets, copper-plated aluminum and steel-plated aluminum. The same combinations can also be produced in wire and tubes. Steel plate coated with aluminum bronze are contemplated as a very suitable material for shipbuilding. The process is the invention of Heinrich Wachwitz, of Nuremberg. It is stated that the demand for the metals prepared in this way is already considerable, and that other works are to be erected in Germany and also in England. There is no doubt as to the usefulness of coating a cheap metal with a more expensive one for many purposes, which is what is done in the manufacture of tin-plate, terne-plate and galvanized iron; but the advantage of copper-plated sheet zinc over unplated sheet zinc, for roofing, is not very apparent.

THE BOTTOM LEVELS AT CRIPPLE CREEK.

BY GEO. J. BANCROFT.

The ore shoots of Cripple Creek present an unusually interesting field for study. Just at present local interest is centered on the results of the developments near the present drainage level, which is at about 8,950 ft. above sea level. The new drainage tunnel will probably begin to draw water on Setpember 1, so none of the mines are trying to lower the water-level by individual exertion, preferring to wait and see what the tunnel will do for them.

Herewith follows a brief statement of the experience of a number of representative mines.

1. The *Portland* shaft is down 1,200 ft., but the two bottom levels have been very little developed. The Portland is a mine of so very many veins that it would be a long story to trace out the experience with each ore-body as depth has been attained. Manager Finlay states that, as far as the developments have progressed, there is no sign that the ore-bodies play out. Some of them are larger and richer than above, and some are smaller and poorer.

One of the larger bodies opened on the 10th level is the Hidden Treasure, which is 500 ft. long, has an average stoping width of 10 ft., and the average value of the shipments has been $35.[1]

The country rock is granite, andesite and andesitic breccia.

2. *Stratton's Independence* shaft is down 1,400 ft. Very little ore has been found on any of the lower levels. Manager Cornish says he is going to prospect the lower levels further. The general impression is that Stratton's Independence stands small show of finding any very good ore-bodies in its lower levels, because there never were any important shoots in the granite and, owing to the fact that the contact with the breccia pitches off flatly into Portland ground, the shaft is getting farther and farther from the contact the deeper it goes. The bottom level is 600 ft. below the water level of the district. The formation is granite and andesitic breccia.

3. The *Gold Coin* shaft is down 1,200 ft., and, next to Stratton's Independence, its bottom level is nearer sea level than any other shaft in the district. The Gold Coin vein is an erratic vein of low-grade

[1] In the Cripple Creek District the ore is invariably sorted at surface; as a rule about one-half of the material, as broken, is sorted out, so that the shipments to the mills are usually twice as rich as the crude ore. These ratios, however, vary between wide limits.

ore. The last place it was cut was on the 10th level and here it was poor. So it had been on seven and three. Between the Gold Coin vein and the shaft is a vein called the Dorothy. This vein was barren above the ninth level. On this level an ore shoot was struck, which went up 60 ft., and extended along the level 350 ft., the average width being 18 ins. On ten this ore-shoot was 500 ft. long and 2 ft. wide. On eleven and twelve the Gold Coin vein was never reached, and the Dorothy vein was not developed the full length of the ore shoot because the water kept increasing in volume till it overcame the pumps, so that eleven and twelve were abandoned and have remained under water for a year and a half.

The shipments from the Dorothy vein on the ninth level averaged $22, and the vein was 18 ins. wide. The shipments from the twelfth level averaged $34.50 per ton, and the vein was stoped 4 ft. wide. The formation is entirely granite.

4. The *Golden Cycle* shaft is down 1,000 ft., the bottom level being very near the present water level of the district. There are two ore shoots revealed on the 10th level, these have a combined length of 400 ft. on the strike of the vein. The average thickness is 10 ft., and the average value of the shipping product has been $35 per ton. One of these ore shoots was discovered on the 9th level, and did not exist above that level. It is richer and larger than the old ore shoot, which has been followed down from the surface. The 10th level is the best level in the mine so far. There has been a marked improvement in each succeeding level below the 7th.

The country rock is trachytic phonolite and andesitic breccia.

5. The *Vindicator* shaft is down 1,200 ft., and the bottom level is 25 ft. below the level of the Standard Tunnel, which drains a great portion of the camp, and is at 9,034 ft. above sea level. On the Vindicator 1,000-ft. level the ore shoot had a total length on the strike of the vein of 400 ft., an average thickness of 9 ft., and the average shipping value of the ore has been $50 per ton. There is no work done on the 11th level. On the 12th level a cross-cut has been driven to the vein, and a drift is now being driven toward the point where the ore shoot may be expected. In driving the cross-cut two veins were found to carry high values, which were entirely barren above, moreover, nearly all the little seams and crevices at this level show high values, so that a large amount of low-grade ore could be produced from the walls of the veins.

The formation is andesitic breccia and nepheline syenite.

6. The *Eagles* shaft is 1,500 ft. deep. The bottom level is 200 ft. above the drainage level of the camp. The main ore-body of the mine lies some distance from the shaft and cross-cuts have been driven on the 5th, 8th, 11th and 15th levels. The ore shoot has never been found above a point 60 ft. from the 8th level. The 11th level is the best level yet opened up. The ore shoot was 120 ft. long here, the average stoping width was 5 ft., and the average value of the shipments was $60. On the 15th level two veins have been cut in the cross-cut, and the first one carries high values. The same vein on the 11th level, vertically above, was entirely barren. At 200 ft. south of the main cross-cut another cross-cut shows about 20 ft. of fissured country rock, every little seam of which carries high values. The whole mass is low-grade ore. The main ore shoot is not expected until the drift has been driven 200 ft. further south. The ore on this level was heavy with iron and copper pyrites.

The formation is trachytic phonolite and andesitic breccia.

7. The *Doctor-Jackpot* shaft is only 700 ft. deep, but the lower level is not more than 60 ft. above the present water level. The ground at the 6th and 7th levels was lean and yielded only a small profit above working costs. Two winzes have been sunk below the 7th level, and each has uncovered richer ore as depth was gained. Both of them show a narrow streak of extremely rich gray copper ore, besides about 3 ft. of lower grade, but profitable, ore. The winzes are about 200 ft. apart. The shipments from the winzes have averaged $40. Manager F. M. Woods says that the indications point to another such body of ore as occurred in the shallow workings of the Doctor Jackpot.

The formation is andesitic breccia.

8. The *Gold King* shaft is down 920 ft. The 6th and 7th levels were pretty lean pickings. On the 8th level the top of an ore shoot was encountered, which did not go far above the level. A winze was sunk 65 ft. below the level, and in the bottom of the winze a cross-cut 16 ft. long was made. The showing is 4 ft. of ore that assays $80 per ton and 12 ft. of lower grade ore. This is the best showing ever known in the mine. The length of the ore shoot has not been determined as yet. The bottom level was extended to the vein and some nice specimens were obtained, but the next round of holes brought such a flow of water that the level was flooded and has not been recovered yet.

The formation is andesitic breccia and schist.

9. The *Shurtloff* shaft is also 920 ft. deep. No ore of any amount was encountered above the 750-ft. level. On the 800-ft. level the ore was 160 ft. long, the average stoping width was 5 ft., and the average value of the shipments were $45. This was the best level in the mine. On the 920-ft. level a cross-cut was run to the vein and the showing is better than on the 8th level, as far as it has progressed, but the gas is bad and has seriously interfered with the work.

The formation is andesitic breccia.

10. The *Findley* shaft is 1,300 ft. deep. The 5th and 6th levels were lean. A new ore shoot came in at 750 ft. from the surface, and has been followed down to a depth of 1,300 ft. The 12th level was the best level in the mine. Here the ore shoot was 350 ft. long on the strike of the vein, had an average thickness of 4 ft., and the shipping ore had an average value of $35 per ton. On the 1,300-ft. level the vein was cut and some good assay obtained, but gas has prevented doing any work.

The formation is andesitic breccia.

11. The *Blue Bird* shaft is 1,350 ft. deep. The 6th, 7th and 8th levels never yielded much ore, but on the other hand, the development work is limited on these levels. Ore was found again on the 9th level and on the 11th level the most work has been done, here the ore was between 300 and 400 ft. long, and had an average stoping width of 5 ft. On the bottom level a body of very high-grade gray copper ore was followed by a drift for 40 ft., and by a winze for 20 ft. The gas is so bad on the bottom level that work has been seriously interfered with. The bottom level is just about at water level.

The formation is trachytic phonolite, cut by a very strong phonolite dike.

12. The *Last Dollar* shaft is down 1,220 ft., the bottom level being about 65 ft. above the water level. The most remarkable showing at depth of any mine in the camp is seen in the Last Dollar. The bottom level is very much the best level. Like the Vindicator and Eagles all the little seams and cracks within 20 ft. of the veins are found to carry high values, so that, Manager Walden says, the entire mass, 75 ft. wide, between the two main veins, can be regarded as low-grade ore. The ore shoot on the main vein is 450 ft. long; on the parallel vein the drift is 100 ft. long, and there is ore in both breasts; between these, two veins were found to carry good values, which were entirely barren above. There is a drift 50 ft. long on one and 75 ft. long on the other, and ore in all four breasts. Two ore-bearing cross-veins have been opened up. There was only one above. There are drifts on each cross vein 75 ft. long, and ore in two of the breasts. The ore of one cross vein is heavy with iron and copper pyrites. All the other veins show gray copper. Two winzes have been sunk below the level, 50 ft. each, and there is very rich ore in the bottom of each. The average stoping width on the bottom level will be about 7 ft. Altogether there are 825 ft. of the drifts of the bottom level that show ore, and there is ore in eight breasts. Five hundred feet of ore is as much as any upper level showed. The 7th and 8th levels were the poorest in the mine.

The formation is andesitic breccia.

13. The *Princess Alice* shaft is down 1,000 ft., and a winze from that level is down 320 ft., making 1,320 ft. in all. In the winze a very rich ore-body was struck at 1,220 ft. from the surface and followed down 100 ft. It has been drifted on for 40 ft. at two different levels; but the actual length of ore has not been ascertained. The ore is about 4 ft. thick. While this is not a very large ore-body, as far as opened up, it is probably as big as any in the mine. The ore shows gray copper and fluorite all through it.

The formation is trachytic phonolite.

14. The *Wild Horse* shaft is 1,250 ft. deep. The two bottom levels never reached the vein on account of gas. The biggest stope in the mine is between the 870-ft. level and the 970-ft. level. This stope is 100 ft. along the vein, 15 ft. wide on the average, and the shipments have averaged $90 per ton, with hardly any sorting. The ore is mud, enclosing quartz and granite fragments, and the country rock is granite. There was a steady increase in value of the ore from the surface to the 970-ft. level.

15, 16 and 17. In the *Isabella* and *Victor* the evidence justifies the conclusion that the ore did not go down. Some very rich ore was found on the 10th level of the Isabella, but the quantity was limited. The largest bodies of good ore in these two mines were above the 500-ft. level. These veins are northwest and southeast in strike. They are crossed by the *Empire State* series of veins, which trend northeast and southwest, and in the latter there is every indication that the values are going down. Very little development work has been done on the Empire State veins at the bottom level, which is 850 ft. deep, but one ore-body has been developed 225 ft. long, and several other veins have been cut, and there is no indication of impoverishment as yet. Inasmuch as the Empire State veins have the trend of the main ore-bearing veins of the camp it has been suggested that they are the source of enrichment of the Isabella-Victor veins, and that the latter became enriched near the surface, because the basalt overflow of Bull Cliffs prevented an easy egress to the surface and the mineralized waters spread out along these cross veins.

The formation is trachytic phonolite and andesite breccia.

18. The *Elkton* shaft is 800 ft. deep. I have not the exact figures regarding the ore on the bottom level, but it is counted as one of the best levels in the mine. This level was abandoned on account of water. It is 180 ft. below the present water level.

The formation is andesitic breccia.

19. The *Hull City* placer shaft is down 1,180 ft. The bottom level is near the present water level. Some very rich gray copper ore has been found on this level. The main ore shoot is 450 ft. along the strike of the vein, 8 ft. wide, on the average, and the average value of the shipments has been $40. This is quite the best level in the mine below the 7th.

The formation is andesitic breccia and nepheline syenite.

20. The *Ajax* shaft is 1,200 ft. deep. The lowest level on which any work was done is at 1,000 ft. Here the ore-bodies were just about as good as anywhere in the mine. In sinking the shaft a 6-in. streak of granite ore was cut at 1,200 ft., which assayed $100 per ton. This is exceptionally rich ore for this mine.

The formation is granite and andesitic breccia.

21. The *Midget* is down 750 ft., and has struck some rich gray copper ore near the present water level. I have none of the details at hand.

The formation is andesitic breccia.

22. The *C. O. D.* has long been considered a worked-out mine. Mr. T. B. Burbridge sank the shaft down to 1,000 ft., which is near the present water level. In drifting toward a spot underneath the old ore shoot, but when still 100 ft. away, he broke into 4 ft. of $80 ore, showing gray copper. At the time of writing the find has not been developed enough to prove its extent. This mine was very poor on the 7th and 8th levels.

23. There are four other deep shafts in the camp and none of them have any ore in their bottom levels. In one case ore pitched across the end line into the neighbor's territory, in another case the orebody did not go down, and in the other two there never was any ore to amount to anything anywhere in the workings.

Thus out of 23 deep shafts which had ore at all, 19 have good ore on the bottom levels and nearly every one of these bottom levels is near the present drainage level. Many of the shafts had lean ground for two or three levels. The number of strikes near the present water level is noticeable. I cannot understand why the drainage level, which is 500 ft. below the original water level, should have anything to do with ore occurrence. Not only have an unusual number of strikes been made at this horizon, but it also marks the limit of the evidences of oxidation. Possibly the water stood at about this elevation at some time in the past.

A study of the location and formation of the various workings does not seem to result in anything. Good ore has been found at depths all over the camp, and in all kinds of formation.

AN EXPERIMENTAL REVERBERATORY FURNACE.

By Woolsey McA. Johnson.

In metallurgical work, it is frequently desirable to experiment on a small scale. In an electrolytic vat 24 ins. by 36 ins. by 12 ins. it is possible to duplicate all the reactions of a vat ten times the size, as the size of electrodes is in each case the same. In fire work, however, it is hard to reproduce in a small furnace the conditions of a large furnace. To attain this result, I set about to build two small furnaces which would enable me to study the ordinary metallurgical processes, thoroughly and at the same time easily and cheaply, and to be able to apply these microcosmic results to large scale operations.

Three methods of heating presented themselves to me, viz., either by gas, electricity or oil. The gas of the city in which I live is of so low calorific power as to need a regenerative apparatus in flue to give any heat. An electric furnace is ideal, and for various work has been used by me, but it is too dissimilar in its action to a large coal reverberatory furnace to be desirable. Coal, of course, is out of the question for a small furnace.

I accordingly decided to fire my furnaces by crude oil. The burner to be adopted should, of course, be simple, and should enable one to adjust the temperature of the flame and also to make the flame either strongly oxidizing, weakly oxidizing, neutral, or reducing. Any burner that forces in the oil by steam or compressed air will fail in this respect. It was thus thought best to use that type of burner known as the Nobel oil-tray burner. (See Howe, "Metallurgy of Steel," pp. 302-303.)

The burner finally evolved different from the old type markedly. It consists of a small cast iron pan A, 4 by 8 ins., set in a brick compartment of slightly larger dimensions. This pan is heated by a large Bunsen burner, B, underneath. This burner keeps the pan red hot, and thus "destructively distills" the paraffines in the crude oil, and forms thereby a gas of great calorific power. The slight amount of oxygen necessary for this operation comes from small holes made in the fire clay in which the pan is set. The oil is led onto this pan by the ¼-in. gas pipe C. The end of this pipe, where the oil drops on to the hot pan, is wrapped with fine wire gauze to prevent any "striking back" of oil, and to distribute the oil over the pan. As the oil is heated by this time and the gauze is hot, no wax accumulates here. This pipe is fitted with a stop cock and gate valve. The first is used in any emergency to stop flow of oil, and the second is used to regulate the flow to desired rate. A white mark on the handle of the gate valve reads position of valve on a graduated circle above. This pipe is carried and made fast to a heavy 2 by 4-in. joist, fixed securely to ceiling. The pipe finally communicates to a barrel of crude oil on a frame, outside the building, in the basement of which the furnaces are built. The oil is siphoned out of this barrel to the pipe (the siphon being started by a force pump). When the furnace is not in use the siphon is removed. Thus any chance of leak in absence is obviated.

The "oil-gas" ascending this chamber above the hot-pan is met about 10 ins. above pan by a blast of air from a bustle pipe. The two mix in the combustion chamber and produce intense heat, where marked in Fig. 1. This bustle pipe is made of a 3-in. cast iron T, on which are screwed two short capped 3-in. pipe. The front of the bustle pipe is bored with half-inch holes, whose aggregate area is a little larger than that of delivery pipe. The holes are also so placed that the blast is uniform. The blast is furnished by a small centrifugal fan belted to a ½-h.p. 220-volt single-phase alternating-current Wagner self-starting motor. The speed of fan is regulated by the homely method of moving position of motor on table. This tightens or slackens the belt and consequently the fan is either speeded up or slowed down. One would think this very unsatisfactory at first thought, but it apparently works to perfection.

The furnaces proper rest side by side on a heavily built timber table, the top of which is covered with red brick. On this brick top is placed a ¼-in boiler plate, supported by brick, so arranged that an air space is left under the pan, as per Fig. 1. The furnace is simply ironed by bar iron bent so as to include the furnace on top and both sides. The shape is then like a rectangle, with one side open. This side is completed by a turn-buckle and wire tie-rod. The turn-buckles used by me were bought at a hardware store, and are those used in buck saws. They cost 8 cents each, and did the business.

The top of the furnace I made of sections similar to those in a top of flue. Iron 3 by ½ in. was bent so as to include a bundle of keyed firebricks. An eye bolt was screwed in this. The top of the furnace was made of eight of these sections, jointed with fireclay. This top possesses many advantages. Any part can be removed in a minute, exposing the furnace below for repairs or examination. The shape of the furnace can be altered by taking off part of top and putting on an additional course of brick. Or it is possible to use the furnace as a crucible

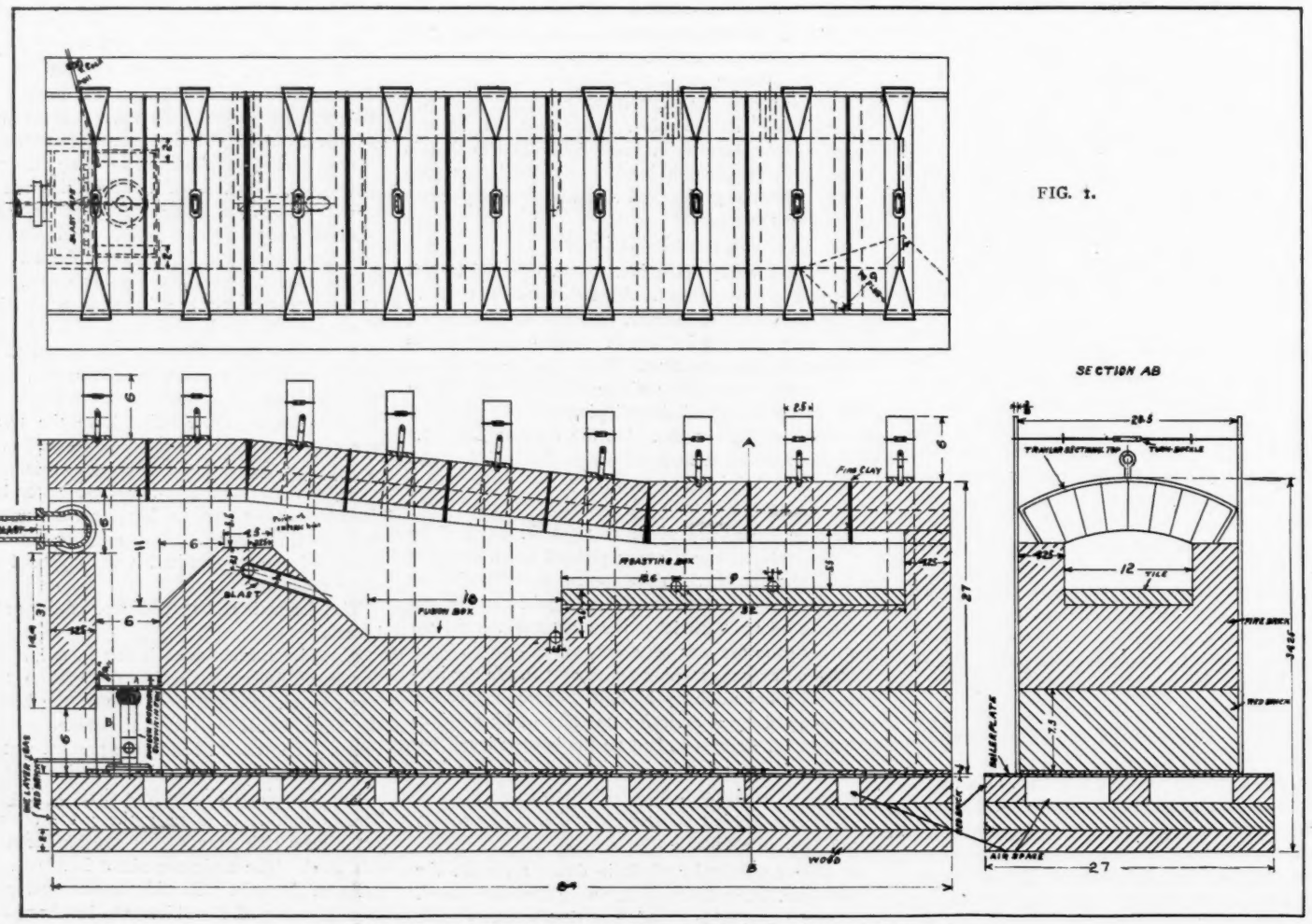


FIG. 1.

SMALL REVERATORY FURNACE FOR EXPERIMENTAL METALLURGY.

furnace by putting in block and falls to raise a section. For this excellent idea I am indebted to Mr. S. W. Traylor, manager of the New York office of the Colorado Iron Works Company. The doors of the furnace are simply large firebrick. The iron work and top can be seen in Fig. 3.

The temperature of the roasting compartment can be held very steady, by adjusting the gate valve. It has been kept to within 10° C., or 18° F. for a long period. It is possible to have a reducing flame, but this is rather hard, for the reason that the oil-gas will deposit soot and still have some oxygen in the air. I have done roasting of sulphides with black smoke pouring out of the stack. The trouble is that the chambers must be kept hot or the gases will not combine. For low temperature roasting it is well to use kerosene oil instead of fuel oil, as it is easier to regulate.

In the fusion compartment a blue heat can be obtained, in about two hours on fuel oil. Nickel or mild steel can be melted in less than that time. Copper will go in about 30 minutes from a cold furnace. In fact, I believe the top of the furnace could be melted in a 6-hour run. The firebrick has often started to run and drip in 40 minutes. The easy regulation of character of flame by adjusting the blast, or burner which heats pan or flow or oil, enables one to make an accurate study of the metallurgical reactions by means of a pyrometer. I have studied, and am studying, chloridizing of precious metals and copper, reducing finely divided iron oxide, nickel oxide and their consequent chemical activity, rate of desulphurization of mattes, etc.

It is so easy to estimate wrongly the temperature by eye that for accurate work a pyrometer is indispensable. By this means it is possible to ascertain bottom facts in a short time that only years of practical experience would disclose. If the metallurgist uses his eye to judge heat (and it is a valuable and cheap pyrometer if its observations are mixed with a grain of mace) he should be very careful to standardize his eye by a pyrometer, at intervals. At night it is much easier to be certain of heats than by day, when light is variable. For that reason an expert temperer of my acquaintance used to do all his fine work at night.

Two of these furnaces, with brickwork, ironwork, carpentry, wiring for motor, motor, fan, incidentals as rabbles, ladles, etc., and Reichanstalt pyrometer cost $400. Mr. W. M. Saunders, formerly of the Nichols Chemical Company, developed with me these furnaces into their present shape.

PROFESSOR H. M. HOWE ON SIR HENRY BESSEMER.

At the Bessemer Memorial Fund meeting in London, June 30—to which reference has already been made in our columns—Prof. Henry M. Howe, of Columbia University, spoke of Bessemer's achievements as follows:

"Let the world honor Bessemer because, like Watt and Stephenson, like Morse and Bell, he gave it gifts of inestimable value.

"It is no answer to say that gold and iron are good to pay for iron and gold; that he had his material reward during his life. That is no answer, because, in conquering nature, in surmounting the most fearful obstacles by means of his titanic will, his heroic persistence, his marvelous ingenuity, he gave his fellow men a stimulus, an incitement, to strive, the value of which is not to be measured in pounds or in dollars. A monument to him perpetuates in a measure that incitement.

As in honoring Wellington, or Napoleon, or Washington, we honor also their generals who gave them indispensable aid, honoring chiefly the great central figure, the great moving and directing force, so in honoring Bessemer we honor also those whose aid to him was indispensable. And here we ask, not whether the part played by this man or that was indispensable, but rather which was the irreplaceable man, the moving and directing man? Isabella's aid was indeed indispensable to Columbus, yet had she refused some other might have been persuaded to give. She might be replaced, but who could replace Columbus?

"Looking back upon metallurgical knowledge as it then existed, and more particularly upon the great variety of serious obstacles which Bessemer surmounted, I firmly believe that if that indispensable aid had not come to him, through those who actually gave it, it would have come in some other way. For here was a Hercules; here was one who made ways when he did not find them. He was the moving, the directing, force; he alone was irreplaceable.

"As there is one glory of Columbus and another glory of Isabella, so is there one glory of Bessemer, and another glory of his illustrious coadjutors."

A PROMISING GOLD FIELD, AND TESTS BY SAMPLING.

BY AN OCCASIONAL CORRESPONDENT.

Mr. Lindgren's instructive paper on the geographical distribution and geological features of the gold deposits of North America,[1] brings to mind—among other probable future sources of the metal—the very considerable mass of gold-bearing quartzite existing on the Trinchera Estate in Costilla County, Colorado. It is worthy of mention in connection with the subject of mine sampling, on which so much has been said of late in the ENGINEERING AND MINING JOURNAL.

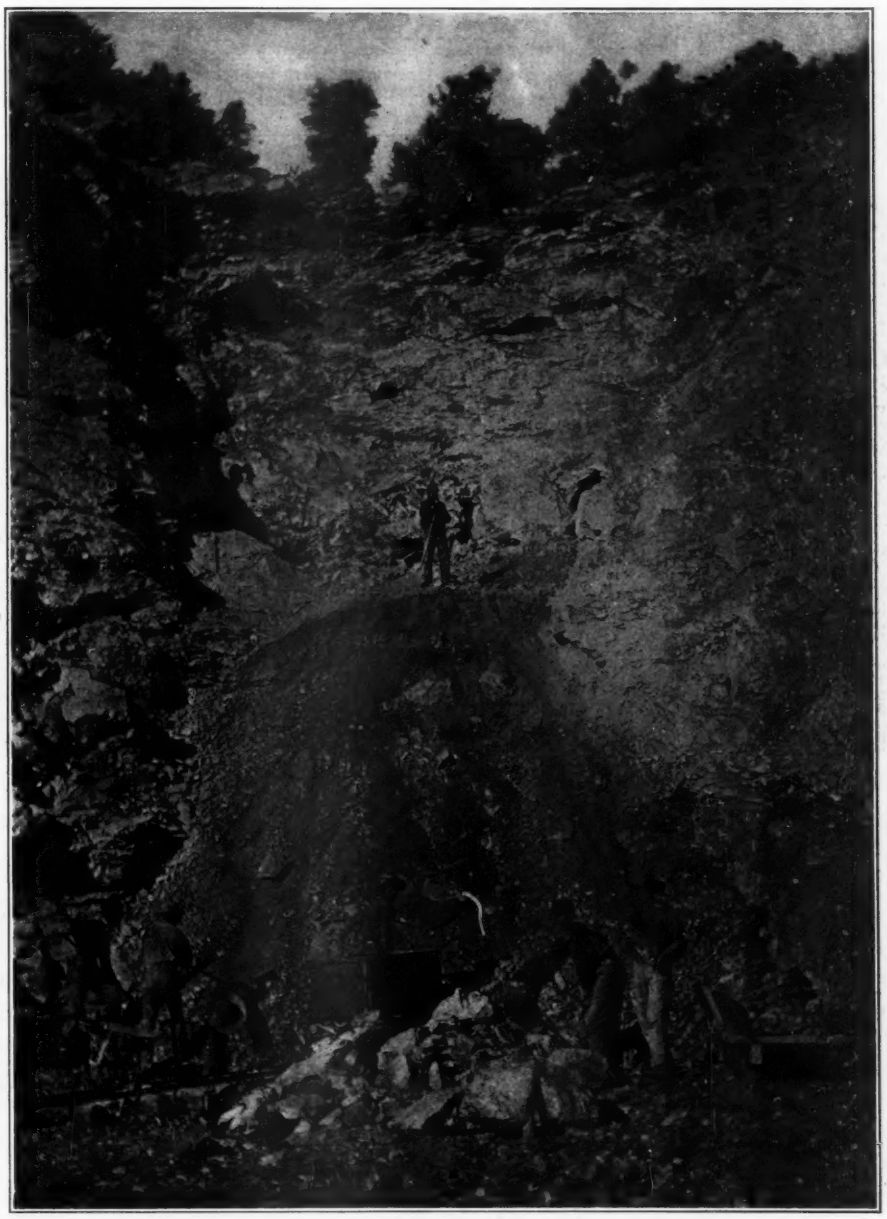


FIG. 1.—PLOMO QUARRY, TRINCHERA, COLO.

Up to the present time the Trinchera deposits have not received the attention which the facts concerning them certainly warrant, and when they shall be exploited on a scale commensurate with that upon which nature has supplied the raw material, they should contribute noticeably to the gold production of the Centennial State.

Attention was first called to these beds of gold-bearing quartzite through a paper[2] by Messrs. E. C. and P. H. van Diest, in which the geological and mineralogical features of that region were discussed with interesting details, although hardly more than mention was made of the gold deposit.

At a later date the beds were partially explored by drifts and shafts, and an attempt was made to work the ore in a ten-stamp mill. The amalgamating and concentrating appliances provided were, however, wholly inadequate for the purpose intended, and the net results afforded an apt illustration of how an infelicitous start may wreck a meritorious enterprise. Because with the crude apparatus used, only one-half of the gold was saved which was shown by assay to be present in the ore, the owners of the property became discouraged and have made no further efforts to work the deposit.

Only those who have had actual experience in stamp-milling seem to realize the niceties of adjustment necessary in a stamp-mill to meet successfully the individualities of gold ore in different parts of the world. The physical condition of the gold to be treated, its position relative to the other components of the ore, the character of the associated minerals; all these, and many other circumstances, must be very carefully taken into consideration. To accomplish the best results there are many adjustments

[1] "The Geological Features of the Gold Production of North America," by Waldemar Lindgren. *Transactions* American Institute of Mining Engineers. October, 1902.

[2] "Notes on the Geology of the Western Slope of the Sangre de Cristo Range," by E. C. and P. H. Van Diest. *Proceedings* of the Colorado Scientific Society. Vol. V., pp. 76-80.

to be made in the working parts of the apparatus used, as well as in the auxiliaries for collecting the metal. With a rich ore these matters may sometimes be ignored, albeit at the expense of the stockholders; but in the case of a low-grade ore they are of vital importance.

In the experiment referred to above, the plates in front of the batteries were only 8 ft. long, and a concentrator, the "Gilpin County Bumper"—fitted with a copper bottom—was employed to catch the sulphides. The mercury used on the battery plates ran down onto the bumper and amalgamated the aforesaid copper bottom, and then, finding nothing to hinder its further progress, continued on down the tail-race, where it was in evidence a year after the run was made. Some of the sulphides were caught on the bumper; but much also went down the creek. One thousand six hundred and eighty-five tons were put through this mill, and naturally only a small percentage—about $1.50 per ton of rock treated—of the gold was caught. It is surprising that even as much as this was saved.

An interesting fact which has come up in connection with attempts made to ascertain the value of this deposit by the usual methods of sampling, seems worthy of notice, although it has not the merit of novelty. In every instance known to the writer, with one exception, where large amounts of the ore have been taken from this deposit and put through mills, the results have been much higher than those obtained by hand sampling. As an illustration, some years ago an engineer sampled that portion of the property shown in Fig. 1, and obtained the following results:

Locality.	Pounds of ore taken.	Assay per ton, gold.
Lower quarry	7,004	$1.40
Upper quarry	8,583	2.80
Tunnel No. 1	5,941	1.80
Cross-cut	2,438	1.00
Tunnel No. 2	1,468	0.60
Tunnel No. 3	1,507	1.30

The ore which was thus obtained was thrown into a pile, and after the sampling was concluded the whole lot was shipped to Central City and milled. The mill-returns show the gross value of the ore to have been $3.10 per ton (Au, 0.13 oz.; Ag, 0.85 oz.). Although the ore is quartzite with a few per cent of pyrite scattered through it, the engineer in making his report stated: "If this car-load is a fair sample of the mass of the ore, I much doubt whether it could be so worked as to yield a profit, notwithstanding the large quantity available." This statement may surprise engineers who are profitably treating ore of a similar nature and lower grade[3] under conditions much more arduous than those existing on the Trinchera Estate.

Other test lots taken from the workings have run as follows:

	Tons of ore taken.	Assay per ton, gold.
Test made at Idaho Springs	5.	$4.70
Amalgamation test	29.56	3.23
Amalgamation test	123.1	3.37
Amalgamation and cyanide test	219.21	3.48
Cyanide test	18.	3.70
Cyanide test	17.75	5.00
Cyanide test	17.5	5.10
Cyanide test	18.	5.00
Cyanide test	15.	4.40

Hand-samplings by others have given similar results, which recalls to mind a statement once made to the writer by the superintendent of a gold property in another part of the country: "If we ran our mill by the mine assays we should have to shut down," thereby intimating that the mill returns were higher than the mine samplings, making the difference between profit and loss.

Another fact brought out by the samplings of this ore-body is, that different assayers obtain widely differing results from the same sample, even when the pulp is divided after being prepared for the furnace. On one occasion six samples taken by the writer with great care were divided—after comminution—between two firms of assayers, both of long experience. There was absolutely no choice between the two firms, and there are no better men in the business. The certificates read as follows:

Locality.	Assayer No. 1 gold per ton.	Assayer No. 2 gold per ton.
Lower quarry	$1.80	$3.60
Upper quarry (1)	2.60	2.00
Upper quarry (2)	0.80	4.00
Tunnel No. 1 (1)	1.80	2.00
Tunnel No. 1 (2)	0.80	3.20
Shaft A	2.40	1.60

Both firms were informed of this discrepancy, and each made repeated assays of the pulp; but although some slight differences from the original figures were reported, the outcome remained unchanged.

The great differences in the above results obtained from mill-runs of many tons, and from hand-sample assays, are apparent, and the question arises, how are such discrepancies possible, as it can hardly be disputed that the probable truth of the matter lies with the mill-runs.

While admitting that extreme care is necessary in carrying out all sampling operations, the responsibility of the engineer does not rest there—he must also know that his samples have been correctly assayed. The valuation of a mass of low-grade auriferous rock is perhaps more of an assaying problem than one of sampling.

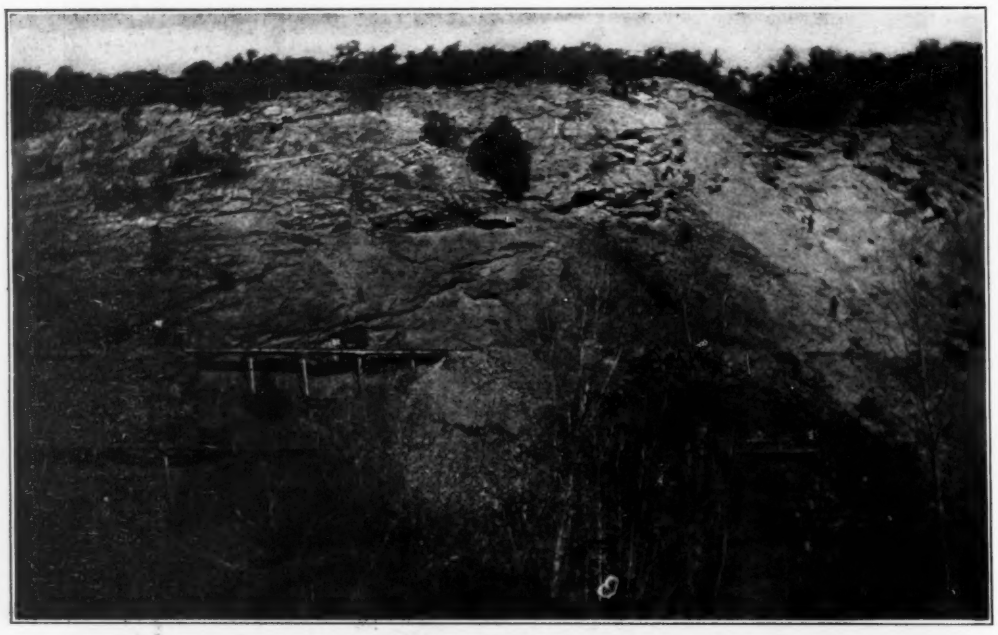


FIG. 2.—SIDE VIEW OF PLOMO HILL, COLO.

Where there are only two or three-tenths of an ounce of gold in a ton of rock, associated with about the same amount of silver, to collect the whole of these metals into a button for parting, necessitates in itself unusual care. Apart from volatilization, there is a loss in the crucible—or scorifier—slag to begin with, as every assayer knows who has tested the slags made in these operations. Then there is a further loss from cupel absorption, and from the distribution of minute particles of the alloy over the surface of the cupel when the buttons are very small. To avoid losses of this description as much as possible, some assayers add weighed amounts of AgCl to the pulp when mixing with fluxes. This assists in collecting the gold, and the larger the button up to a certain point, the less likely it is to become subdivided.

But the greatest loss in gold occurs in parting that metal from the silver. When the acid is not of the right specific weight, or is not chemically pure, or when the water used contains salts in solution, much of the gold may be dissolved. Or the gold may be left in such a fine state of subdivision that it remains suspended in the liquid and escapes detection.

The correct method of procedure is to filter the whole of the parting liquor, burn the paper with extreme care, and cupel the ashes with a small amount of chemically pure lead.

It is evident, therefore, that to ascertain the actual auriferous contents of a rock, where only a small amount of the precious metal is present, is a delicate and time-consuming operation. When several hundred samples of such material are sent to an assayer unacquainted with the exact conditions of the case, it is hardly to be expected that the precautions specified above will be observed with the care necessary for obtaining accurate data upon which to base an estimate of the value of the property. One-tenth of an ounce one way or the other, where immense bodies of ore are concerned, means enormous profits or the loss of the entire investment.

Furthermore, the inaccuracies liable to occur in assaying material which contains one-tenth of an ounce of gold, as against material which will run several tenths, are far greater in the first case than in the latter. When, therefore, the assay results are tabulated and the mean taken, the apparent average is very misleading; the assays which show $8 or $10 in gold per ton are nearer the truth than those which are given as $1 or "a trace."

As the whole of the ore sent to the mills in the case under consideration was put through the batteries—or rolls—and in this manner the poor rock became thoroughly mixed with the higher grade, the pulp taken for assay represented the average value of the ore in bulk, and as the metallic contents of this average is large enough to insure a comparatively thorough collection of the precious metals in the parting button, and as only a few assays had to be made as against the large number of hand-samples taken, naturally the assayer took more care, and the results are higher—more nearly approximating the true value of the ore.

The possible errors into which an engineer can fall when reporting on a low-grade auriferous deposit, basing his opinions upon hand-samples sent to an assayer who does not observe the precautions indicated above, are great, and in justice to his clients and to his own reputation he should see to it that the assays are made with the same care as that with which the samples were presumably taken.

The Trinchera Estate deposits are a veritable goldfield, inasmuch as the flat-lying auriferous rock is known to cover many hundreds of acres. How much more of it can be exposed by removing a comparatively slight amount of overburden, is a matter for conjecture. Fig. 1 gives an idea of the thickness of the beds at the quarry, the ore reaching from below the quarry floor to grass roots. Fig. 2 shows the beds as exposed along the creek for nearly a mile.

GOLD DISCOVERIES IN SIBERIA.—Advices from Tomsk, in Siberia, report the discovery of a quartz ledge carrying free gold near that place, on the Berikule River.

[3] In writing of the Alaska auriferous deposits, Lindgren states: "The lodes along the southeastern coast will probably hold their own or increase for many years, as the most important ones contain great low-grade ore-bodies, the assay value of the ores on Douglas Island being often less than $2.50 per ton."

THE CYANIDING OF SOME SILVER ORES BY PERCOLATION.*

By ANDRE P. GRIFFITHS and FRANK W. OLDFIELD.

The cyaniding of silver ores has been considered as presenting many difficulties, owing to the complex nature of the chemical reactions involved, of which many are still obscure; and the practical application of this process has been retarded by numerous failures and the extensive vogue of pan-amalgamation.

The latter process, however, is expensive, necessitating roasting, dry crushing, and the use of large amounts of salt, etc. In certain countries like Mexico, where there are numerous low-grade silver lodes, and where fuel is scarce and expensive, and transport charges are heavy, the dry-crushing and pan-amalgamation of silver ores cannot be made a profitable undertaking in all cases. It was with a view to reducing costs mainly, and increasing a restricted output, that the cyanide treatment of the low-grade ores of the Palmarejo Mines was suggested and tried. Although the authors are not the initiators of this new departure, yet in their respective capacities of general manager and cyanide manager of these mines, they have treated, since the beginning of operations, nearly 30,000 tons of ore, and have put the process to the test, and brought it to its present commercially successful basis. They are aware of the existence of several plants for the cyaniding of silver ores by agitation, but do not know of any successful percolation plant.

It is in the hope that the results obtained by them may prove interesting, and of some value to the metallurgy of silver, that the authors have been induced to submit these notes.

Description of the Ore and Plant.—The ore belongs to the class of so-called sulphide ores. The silver occurs in the form of argentite (Ag_2S), with small quantities of stephanite, the sulphide of antimony and silver, and occasionally is accompanied by embolite, the chlorobromide. The other minerals present are iron sulphides, with small amounts of galena, blende and chalcopyrite. The gangue is quartz, with calcite and black oxides of manganese; to this is added much clay and iron oxides from some of the upper workings. The ore contains $1 to $2 in gold. The ore is crushed wet, in a converted 50-stamp dry-crushing mill, passed over Wilfley tables, and led into four masonry tanks, each of 350 tons capacity, where the pulp is allowed to settle and drain. The slimes overflow, and are run into pits, and reserved for future treatment.

The cyanide plant proper consists of ten steel vats, 30 ft. in diameter and 4 ft. 6 ins. deep over the filters, and of a capacity of 110 tons each. In addition to these, there are two wooden vats, of the same diameter and capacity, which have just been completed.

The solutions from the treatment tanks drain into three cement sumps of an aggregate capacity of 90 tons; from these they are pumped by 12-in. centrifugal pumps to the upper solution tanks, which are two in number and each of a capacity of 20 tons. From these the solutions pass through five zinc extractors, which are made of steel, each being 18 ft. long, with eight compartments 2 ft. wide, 2 ft. deep, and 2 ft. long. After passing through the extractors the solutions fall into the "strong" and "weak" tanks of 30 tons capacity each, and thence, by gravity, are led to the 12 treatment tanks already described.

The plant was not designed for any slimes separation, and without important structural alterations this could not be done. This must be borne in mind when judging of the results obtained.

Treatment.[1]—With but little to guide them, and before being able to arrive at definite conclusions, the authors worked with solutions of greatly varying strengths and tonnage—the strength of the weak solution varying from 0.25 to 0.7 per cent, and that of the "strong" from 0.7 to 1.25 per cent, the tonnage of solutions used varying from one to three tons per ton of ore. The amount of cyanide and of zinc consumed was gradually brought down from 6 lb. and 1.5 lb. to about 4 lb. and 1 lb., respectively.

The present treatment consists in the introduction, from the bottom, of about 25 tons of weak solution of 0.30 per cent strength, which is allowed to soak for about six hours. This is followed by 30 to 35 tons of weak solution of same strength, which is in turn displaced, after 36 hours, by about 60 tons of strong solution containing 0.75 per cent of cyanide. These 60 tons are turned on from the top, with intervals of soaking varying from three to six hours. After this more weak solution is added, amounting to about 160 to 180 tons, and finally the treatment is completed by water washes.

The solutions are titrated immediately before and after passing through the ore, and both solutions are kept separate and assayed daily for silver and gold.

TABLE I.

Tank number		3
Charge number		189
Tons (dry)		104
Assay value of ore	Gold	$1.24
	Silver	oz. 14.24

Date.	Tons of solution added. Filled	Strength of solution % of KCN.	Assay value of "tails." Gold.	Silver. oz.
Jan. 16	20	.37	....	....
Jan. 17	37	.36	$0.41	10.98
Jan. 18	26	.77	....	....
Jan. 19	22	.78	....	....
Jan. 20	10	.75	0.20	9.39
	15	.40	....	....
Jan. 21	38	.32	....	....
Jan. 22	37	.35	....	....
Jan. 23	26	.35	....	....
Jan. 24	Water Washes sluiced out	....	0.10	6.85
Duration of treatment				8 days
Extraction	Silver			51.9%
	Gold			91.9%

TABLE II.

Tank number		11
Charge number		250
Tons (dry)		105
Assay value of ore	Gold	$2.48
	Silver	oz. 13.38

Date.	Tons of solution added.	Strength of solution. % of KCN.	Strength of solution withdrawn. % of KCN.	Assay Value. Solution. Gold.	Solution. Silver. oz.	Tails. Gold.	Tails. Silver. oz.
	..	..	..	....	....	....	....
Mar. 19	20	.28	..	....	....	....	....
	24	.28	.05	$1.24	1.54	....	....
Mar. 20	20	.28	..	....	....	$0.82	11.96
	10	.80	.10	1.65	2.34	....	....
Mar. 21	12	.80	..	....	....	0.82	10.88
	10	.80	.16	1.81	5.39	....	....
Mar. 22	12	.80	..	....	....	0.20	9.69
	12	.80	.54	2.06	10.30	....	....
Mar. 23	12	.80	..	....	....	0.10	6.40
	20	.30	.52	1.65	2.22	....	....
Mar. 24	20	.30	..	....	....	0.10	6.00
	20	.31	.25	1.24	4.72	....	....
Mar. 25	20	.31	..	....	....	0.10	6.00
	20	.28	.25	0.82	1.10	....	....
Mar. 26	20	.30	..	....	....	0.10	6.00
	25	.16	.23	0.10	0.85	....	....
Mar. 27	20 water	..	..	....	....	....	....
	10 water	..	.07	0.10	1.09	....	....
Mar. 28	Sluiced out	..	..	....	....	0.10	5.98
Duration of treatment							9 days.
Extraction	Gold						95.98%
	Silver						55.24%

Tables I and II are the actual record of the working of two typical tanks.

Although the ore is crushed through a 20-mesh screen with an average height of discharge of 2½ ins., the slime-forming material is such that over 60 per cent of the pulp passes through a 100-mesh and more than 25 per cent through a 200-mesh. In order to show the action of the cyanide solutions upon the various particles, and the distribution of values, Table III is appended:

The above test was made on the same ore and same charge as that shown in Table II. The authors have made many such tests and have found but little variation from the one given in the table.

It is clear from the above that fine crushing has an important bearing on the extraction.

In addition to these tests, numerous samples of the tailings, before sluicing out, were taken in sections, and invariably the assay values of the material gradually increased from the top downwards; although this, of course, is to be expected, the difference is sometimes so marked, amounting to several ounces, that the authors were led to believe that oxygenation of the mass is even more important than in the case of gold ores. In order to prove this, several charges, after receiving the usual treatment and practically having reached ultimate extraction, were transferred into other tanks, the bottom layer being thus shoveled out last, and becoming the top layer of the fresh tank. Invariably, these charges, on being further treated from two to four days with "weak" solution, which had no effect before, yielded from 1 to 3 oz. more silver per ton.

The average extraction is from 50 to 55 per cent of the silver and 90 to 95 per cent of the gold, and the authors think that the silver extraction would be increased by double treatment.

Extractors.—The size of these has already been given; the precipitation by means of zinc shavings obtained by cutting zinc sheets in a lathe, is extremely good. The total tonnage of solution passed through each extractor is about 60 tons per 24 hours, this being over one ton of solution per cu. ft. of shavings per 24 hours. The assay of the solutions average:

Weak solution	Gold	$0.80
	Silver	2.00 oz.
Strong solution	Gold	$1.00
	Silver	3.75 oz.

After passing through the extractors, the solutions assay a trace of gold and from 0.02 to 0.08 oz. of silver.

The precipitation is always accompanied by a very brisk evolution of hydrogen gas. The amount of precipitate to be dealt with is, as might be expected, very large, and its assay value averages silver 20,000 oz., and gold $8,000 per ton.

The ore being filled wet, containing sometimes as much as 25 per cent moisture, there would be an accumulation of weak solution. In order to avoid this, the first few tons of weak and the last water washes, as required, are run through a waste solution zinc extractor, the amount of cyanide lost is small, while

TABLE III.

Sizing Test.

Tank number		11
Charge number		250
Assay value of ore	Gold	$2.48
	Silver, oz.	13.38

Mesh. Stayed on	Per cent of weight.	Assay Value. Gold.	Assay Value. Silver. oz.	Per cent of value of original ore. %Gold.	Per cent of value of original ore. %Silver.	Assay value after treatment. Gold.	Assay value after treatment. Silver. oz.	Per cent of extraction of silver. %On sized particles.	Per cent of extraction of silver. %Calculated on total extraction.
30	10.35	$2.48	13.10	10.35	10.13	$0.20	9.19	29.85	3.02
50	13.00	2.06	12.72	10.80	12.36	0.10	6.60	48.11	5.94
60	15.30	1.85	11.34	11.41	13.00	Tr.	5.70	49.74	6.46
80	7.50	1.65	10.16	4.99	5.70	Tr.	4.40	56.70	3.23
100	8.50	1.60	10.28	5.48	6.53	Tr.	3.90	62.00	4.04
120	9.65	1.60	9.67	6.22	6.97	Tr.	3.80	60.71	4.23
150	2.70	1.85	12.56	4.03	2.53	Tr.	3.50	79.86	2.02
200	6.50	1.90	10.26	4.98	4.98	Tr.	4.30	58.09	2.8[illegible]
passed 200	26.50	3.80	20.30	40.60	40.20	0.10	7.20	64.54	25.94
	100.00			98.86	102.40				57.57

* Abstract from *Proceedings* of the Institution of Mining and Metallurgy, London, June, 1903.

[1] All the assay values are expressed in United States Currency.

practically all the bullion is extracted from these waste solutions.

Consumption of Cyanide, Zinc, etc.—The average duration of the treatment is 10 days, including one day for sluicing and filling.

The consumption of cyanide per ton of ore is fractionally less than 4 lb., while that of the zinc is about 1.1 lb. The amount of cyanide consumed is very large, compared with that in the cyanidation of gold ores, and, although the authors are unable to account analytically for all this consumption, they believe that it is due to a variety of causes which may be classified under the following heads, viz.:

1. "Cyanicides" in the ore, such as manganese minerals, copper, and iron sulphides, etc.

2. The proportionately larger amount of metal to be dissolved which, if compared with a 10-dwt. gold ore, means a proportion of nearly 30 to 1.

3. The complex and obscure re-actions taking place between the silver minerals and the cyanide.

Without entering into the chemistry of these re-actions, the authors think that the solution of the silver sulphides might be explained by the following equations:

Re-actions in which the presence of alkalies would seem to be necessary,

$$Ag_2S + 2KOH = K_2S + Ag_2O + H_2O$$
$$Ag_2O + 4KCN + H_2O = 2AgK(CN)_2 + 2KOH$$

While with the halides the following would take place:

$$AgCL + KCN = AgCN + KCL$$
$$AgCN + KCN = KAg(CN)_2$$

The authors admit, however, that their research in this direction has been limited by lack of time, and their explanation of the re-actions is only tentative. There seems to be no direct action between the silver sulphides and the cyanide, and undoubtedly they are most refractory to the treatment by cyanide.

The acidity of the ore calls for an alkalinity of 1 lb. of pure lime per ton.

Working Costs.—A table of working costs, which explains itself, is appended. It is in Mexican money:[2]

TABLE IV.

Average Cost of Cyaniding.

Potassium cyanide, 4 lb., at 65c.	$2.60
Zinc, 1.1 lb., at 25.5c.	0.28
Lime	0.03
Filling and sluicing out	0.19
Wages	0.18½
Sampling, assaying, etc.	0.17½
Maintenance, filters, etc.	0.01½
Management	0.15
Treatment of precipitates	0.05½
Total	$3.68

This $3.68, Mexican is equal to $1.40, gvt.

General Conclusions.—From the results of their work and experience the authors think that certain conclusions can be drawn, among which are the following:

1. The cyanide treatment by percolation is suitable for the economical working of certain low-grade silver ores.

2. Fine crushing and classification of the crushed material, are necessary.

3. The success of the treatment is brought about by a larger tonnage of a weaker solution rather than by a smaller tonnage of very strong solution.

4. Thorough oxygenation of the mass is absolutely necessary, and double treatment would appear the most satisfactory practice.

GERMAN IRON PRODUCTION.—The German Iron and Steel Union reports the total output of the blast-furnaces in May at 858,311 tons of pig iron; being 33,859 tons more than in April, and 147,891 tons more than in May, 1902. For the five months ending May 31 the production was, in metric tons:

	Tons.	Per cent
Foundry iron	738,274	18.3
Forge iron	345,418	8.5
Steel pig	348,536	8.6
Bessemer pig	168,216	4.2
Thomas (basic) pig	2,442,286	60.4
Total	4,042,730	100.0

The total compares with 3,018,703 tons in 1901; showing an increase of 724,027 tons, or 24 per cent. Steel pig includes ferromanganese, spiegeliesen, ferrosilican and other similar alloys.

[2] All the gold values are expressed in United States Currency, the working costs only being in Mexican money.

LAKE SUPERIOR TRAFFIC.

The movement of freight through the Sault Ste. Marie Canal in June again exceeded all records, the total reported being 5,105,078 net tons. From the opening of the season up to July 1 there were 6,560 vessels passed through the canals, and the total freight carried by them was 11,944,934 net tons; 2,901,856 tons being west-bound, and 9,043,078 tons east-bound. The total shows an increase of 458,433 tons, or 4 per cent, over the corresponding period in 1902.

The mineral freights included in the totals compare as follows, the figures being in net tons, except salt, which is in barrels:

	1902.	1903.	Changes.
Anthracite	103,167	307,863	I. 204,696
Bituminous	1,594,859	2,368,855	I. 773,996
Total coal	1,698,026	2,676,718	I. 978,694
Iron ore	7,806,573	7,439,479	D. 367,094
Pig and manufactured iron	49,850	43,942	D. 5,908
Copper	35,614	32,564	D. 3,050
Building stone	17,231	1,690	D. 15,541
Salt, barrels	174,274	145,287	D. 28,987

The coal movement this year has been unprecedented in volume. Iron ore, on the other hand, shows some decrease. The increase in tonnage this year was in grain and general freight, and not in mineral freights.

The Duluth & Iron Range shipping docks at Two Harbors have made a great record thus far this year in the ore trade. In June they put 863,990 tons of ore itno 177 vessels, so that the average cargo was 4,881 tons. The average time of loading was six hours.

MECHANICAL COAL CUTTING AT ANZIN, FRANCE.—A paper by M. Saclier, as abstracted for the Institution of Civil Engineers, says that the application of coal-cutting machines of American types having been found to be impossible in the Anzin mines in France on account of their great size and weight, the seams, being thin, 28 to 40 ins., and extremely irregular in inclination, a substitute has been found in the modification of the Burton rock-drill used for boring shot-holes in driving through hard ground. This consists in the addition of two conical plugs and sockets, forming a universal joint between the cradle of the rock-drill and the carriage or stretcher-bar, by which it is fixed when at work. By one of these, the machine may be traversed through a small circular arc representing the swing of a pick, while the second allows the cutting plane to be adjusted to suit the inclination of the seam, the whole arrangement being sufficiently compact to be used in workings between lines of timbering only about one meter apart. In a second modification the drill attached to a base, with sledge runners and two jointed pillars, with jack-screw for fixing against the roof, which admits of its use in seams down to 16 ins. in thickness. The depth of cut obtained is 2 meters and the length 2.5 meters from one position. The machines have been in use since January, 1901, for the following purposes:

1. Working out hard seams where the price of getting by hand is very high.

2. Driving main roads in seams when it is required to open new working places quickly.

3. Putting up rises for ventilation on the line of maximum dip of seams between the lower intake and upper return air ways.

The results obtained in driving show that in galleries of large section, 2.2 by 2.3 meters, an advance of 1.5 meters per day may, under favorable circumstances, be obtained; but, on average, not more than 1 meter, which is about 33 per cent above the speed of hand labor, the cost per unit being about the same. In working out coal the yield per hand employed is about 20 per cent higher and the fall of large coal is about 25 per cent more. The latter item alone represents increased profits, the 20 per cent being about absorbed by the extra cost of maintenance and the provision of compressed air.

ABSTRACTS OF OFFICIAL REPORTS.

Waihi Gold Mining Company, Limited, New Zealand.

The directors' report for the year 1902 says: "During the year 179,485 tons of ore (dry weight) were treated, producing £521,575—an average result of $— per ton. This amount, together with £3,599 received for interest, makes a total gross revenue for the year of £525,174. The expenditure in New Zealand and London, including development work in the mine, amounted to £251,437, leaving a profit for the year of £273,737. This sum, added to the balance of £31,650 brought forward from last year, gives a total of £305,387. Out of this the directors have written off £42,153, spent on the conversion of the Waihi and Victoria mills from dry to wet crushing, and alterations to the Union-Waihi Battery, and £7,000 for depreciation of plant and machinery.

Dividends amounting to £206,627 were paid, besides £3,273 interest on new shares, making a total of £209,900; the balance remaining to the credit of revenue account on December 31 being £30,353. A sum of £16,456, spent on sinking and equipping shafts, and £13,073 upon additional machinery and the acquisition of water rights, and £1,567 spent on erecting wharf and sheds at Paeroa, have been charged to capital account. The total expenditure on capital account at the end of the year, including the purchase of property, was £505,579, and as the amount received on shares, including premium, is £580,489, there remains a balance on capital account of £74,910. The balances December 31, as follows: On reserve account were £100,000, and on revenue account, £30,353; making a total of £205,263. In addition there are 4,093 shares unissued.

At the mine the developments during the year have continued to be of a satisfactory nature, the most important features being the opening out of the various reefs on the No. 6 level, the discovery of a valuable branch lode to the north of the Martha Reef, and the discovery of strong and payable ore bodies in the Albert Reef. Upon opening the 6th level a greater quantity of water was met with than had been expected, due largely to the cessation of pumping in the adjoining mines, the water in those mines in consequence having been thrown upon the Waihi pumps. This occurrence, and the necessity to provide for similar contingencies in future, has made it necessary to enlarge the pumping plant, and this opportunity has been availed of to increase the capacity of the whole plant for sinking to 2,000 ft., instead of 1,200 ft., as previously arranged.

During the year the conversation of the remaining stamps at the Victoria Mill from dry to wet crushing was completed; the whole 200 are now wet crushing. The Union Mill of 40 stamps, which was acquired by the purchase of the Union-Waihi Company's property, was put in order, the necessary tramway completed, and crushing started on September 15. The Waihi Mill, 90 stamps, was run entirely on dry crushing during the year, being prepared during the same time for conversion to wet crushing. This was completed in January of this year, and now the whole 330 head are engaged in wet crushing.

Parral Mines, Limited, Mexico.

The report of this Mexican company, as issued from the London office, covers the period from the date of incorporation of the company to December 31, 1902. The directors' report says:

"The object for which the company was formed was to unwater and work the rich lode which had been worked down to water level by the old Parral Company. Shortly after operations began, however, the mine manager reported the discovery of large quantities of valuable ore in the upper levels of the mine, the extent and value of which justified, in his opinion, at once increasing the mill to 30 stamps, as well as conducting further extensive development operations in that part of the mine. The directors authorized this work to be undertaken, in the belief that the profits arising from the treatment of these

ores would be more than sufficient to make the mine self-supporting, independent altogether of the larger profits expected to attend the development of the rich ore below the present water level. The directors regret, however, that success has not, so far, attended the treatment by amalgamation of the ore in these upper levels. Great difficulty has been found in obtaining a sufficient quantity of ore of a homogeneous nature to ensure a full supply to the mill; as the ore has proved to be not only very variable in character but also, in many cases, intractable in nature, very careful sorting is necessary. In addition to this preventing the continuous running of the mill, its economical working has been hampered by various technical and other causes—(such as temporary failure of the pumping apparatus at one time and irregular delivery of fuel at another), so that the mill has so far hardly done more than make experimental runs. Having regard to the unsatisfactory results, the directors found it necessary to make some alterations in the personnel of the staff at the mine, and to call in fresh expert advice. They were then advised against continuing the policy of attempting to develop the upper levels, but to confine their attention strictly to the original object of the company, and to suspend milling operations until a continuous supply of homogeneous ore is available for the mill, and this has been done. In the meantime the new manager has succeeded, after various experiments, in concentrating the most refractory of the ores in the upper levels upon a profitable basis, the cost of the development work being thus materially reduced.

"The lowest level is being driven towards the old shaft and workings, with a view to opening out the rich ore which it was the original object of the company to work, and a payable grade of milling ore has already been disclosed there. It would thus appear that, although the profit-earning stage has not yet been reached, the mine will shortly become self-supporting. In consequence of the difficulties encountered in the treatment of the ore in the upper levels, and of the enlargement of the mill at an earlier stage than had been originally contemplated, it became necessary to issue £10,500 bonds at par, and further liabilities have also been incurred.

"At a conference between the directors of this company and the directors of the Diaz Mines, Limited, and the Beckman Mines, Limited, it was unanimously decided that it was in the best interests of the three companies to enter into an amalgamation, by this company taking over the other two companies' properties and assets. These properties immediately adjoin this company's mine, and although they are not in such an advanced state of development as the Parral Mine, nor equipped with the large plant which the Parral Company possesses, still, having regard to the fact that the two other companies will bring in £23,000 of working capital, after discharging the bond issue, the directors consider the proposal an equitable one and advise its acceptance. The issued capital of each of the three companies is £30,000 and, in order to carry out the scheme of amalgamation, it is proposed to increase the capital of this company to £120,000, which will provide £30,000 in shares for the Diaz Mines, Limited, and the Beckman Mines, Limited, respectively, and allow of a reserve capital of £30,000 for future issue if required."

Mount Lyell Mining & Railway Company, Tasmania.

The directors' report for the half-year ending March 31, 1903, says: "The output from the mine represents the third largest half-yearly production of pyrites since the commencement of smelting operations. The quantity won aggregates 150,964 tons, consisting of open-cut and underground ore, with a small quantity of precipitates from the mine water, the total tonnage for the six months being 8,670 tons less than for the previous half-year. Exploration work has been continued in connection with the main ore-body as well as on several of the company's adjoining leases, in which work the diamond drill has been extensively used. Towards the close of the half-year the company acquired at nominal figures, the leases formerly owned by the West Lyell Extended and Prince Lyell Mining companies, both of these leases being within the sphere of the company's operations.

"In the reduction works improvements and economies have been effected in this department during the half-year, which have had considerable bearing upon the success of the company's operations. The result has been a marked effect upon the consumption of coke, its use having been almost entirely discarded in the No. 2 plant. In addition, mechanical improvements have been introduced which have resulted in large economies in labor and firewood. Your directors desire to express their appreciation of the success which has attended the efforts of the general manager. These efforts have led to the perfecting of the pyritic treatment and reduction in the cost of producing blister copper.

"The pyrites treated during the half-year totaled 146,124 tons, or 13,326 tons less than for the previous six months. The assay value of the ore was: Copper, 2.204 per cent; silver, 2.05 oz.; gold, 0.070 oz. In addition to the above quantity of pyritic ore, 23,064 tons of metal-bearing flux from the South and Royal Tharsis mines, together with 229 tons of purchased ores, have been smelted. The average value of the metal-bearing flux was: Copper, 1.63 per cent; silver, 0.18 oz.; gold, 0.023 oz., and of this material 4,527 tons were treated in excess of last half-year.

"The blister copper produced during the half-year was 2,908 tons, of an assay value of: Copper, 98.79 per cent; silver, 95.26 oz., and gold, 3.387 og., and contained 2,873 tons metallic copper, 276,988 oz. silver, and 9,850 oz. gold.

"The prevailing depression which has existed in the district has made itself felt in the returns from the railway, the profits for the past six months being £3,746, as compared with £4,796 for the previous period.

"At the Port Kembla coke works the large economy in the use of coke in connection with the company's smelting operations, due to the improved methods of smelting now in vogue, has led to the output being reduced. In addition to the production for the company's requirements considerable quantities have been sold.

"The net profit for the half-year amounts to £48,666, after writing off £1,375 for dividend and income taxes, £18,319 for depreciation on plant, and £7,993 for prospecting work which has not been charged to mine overburden account. The net profit shows an improvement of £3,317 over the previous half-year, notwithstanding the smaller quantity of blister copper produced during the period.

During the half-year £27,500 was distributed in two dividends of 1s. per share, which were paid October 1 and January 3, respectively. A further dividend of 1s. per share was declared during the half-year, payable April 1 out of the profits of the half-year under review.

"The economies and improvements effected in the several departments, and which have already been referred to, have favorably influenced the cost of producing blister copper during the half-year. The costs, as shown by the subjoined statement, were $4.4474 per ton of ore, showing an improvement of $0.2788 over the figures for the previous six months. The costs of the operations in the several departments were as follows:

	Per ton of ore.
Mining operations	$0.5286
Removal of overburden	0.5000
Smelting operations	3.0762
Converting operations	0.3426
Total	$4.4474

"After making full provision for amounts due by the company, and taking the copper on hand, middle products, etc., at conservative valuations, the liquid assets of the company, exclusive of stores, coal, coke, etc., represent a total of £251,718."

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail price. These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

Proceedings of the Lake Superior Mining Institute. Volume VIII, 1902. Ishpeming, Mich.; published by the Institute. Pages, 92; illustrated.

Sex in Industry. Prepared by the Massachusetts Bureau of Statistics of Labor; Charles F. Pidgin, Chief. Boston, Mass.; State Printer. Pages, 128.

United States Geological Survey. Production of Sulphur and Pyrite in 1902. By Joseph Struthers, Washington; Government Printing Office. Pages, 18.

Washington Geological Survey. Volume II. Annual Report for 1902. Henry Landes, State Geologist. Tacoma, Wash.; printed for the Survey. Pages, 284; illustrated.

Yearbook and Directory of the Chamber of Commerce of Pittsburg, Pa. Compiled by George H. Anderson, secretary. Pittsburg; published by the Chamber of Commerce. Pages, 174.

Electrically Driven Shops. By Robert L. Warner. Reprinted from *Proceedings* of the New England Railroad Club. Pittsburg, Pa.; the Westinghouse Electric and Manufacturing Company. Pages, 52; illustrated.

Geological Survey of Canada. Volume XII, New Series. Reports and Maps of Investigations and Surveys. Robert Bell, Acting Director. Ottawa, Canada; Public Printers. Pages, 972; with maps and illustrations.

Referendum Bibliographique. Precede de l'Expose des Principaux Resultats Scientifiques et Economique du Service Geologique de Belge. By M. Moulon. Liege, Belgium; H. Vaillant-Carmanne. Pamphlet, 16 pages.

BOOKS REVIEWED.

British Columbia. Annual Report of the Minister of Mines for the Year 1902. E. G. Prior, Minister of Mines; William F. Robertson, Provincial Mineralogist. Victoria, B. C.; Public Printer. Pages, 320; with maps and illustrations.

We published recently in the JOURNAL an abstract of the general statements for the year 1902, contained in this report. In addition to this information on the condition of mining in British Columbia, the report contains, as usual, a large amount of special information, including the reports on the different districts, their progress, and the work which has been done upon them during the past year. The conditions of mining in the Province are very fully dealt with, and the reasons for the comparatively slow advance made in 1902 are carefully set forth.

Mining Rights in the Western States and Territories. Eleventh Edition, Revised and Enlarged. By R. S. Morrison and Emilio D. de Soto. Denver, Colo.; the Smith-Brooks Printing Company. Pages, 532. Price, $3.

Morrison's "Mining Rights" is a book so well known and so well established that it can hardly be criticised at this late day. The appearance of the eleventh edition shows the esteem in which it is held, and its wide circulation. In the present edition, while no important changes have been made in the form or in the arrangement of the book, it has been thoroughly re-written wherever necessary, new references added and the statements of law and practice carefully brought up to date.

It is a book which continued use has proved to be indispensable, and it is also generally accepted as very reliable. The analytical index and the table of cases cited are carefully arranged, and add very much to the general usefulness of the book. The summaries of district and State laws, supplementing the United States mineral law, are complete and

very useful. The directions for organizing mining companies are also valuable. We can hardly add much in the way of describing it, or do more than indorse the general approval of this convenient manual.

Register of Oil Wells, Los Angeles City, California. April, 1903. Compiled by Charles A. Blackmar. San Francisco, Cal.; issued by the State Mining Bureau. Pages, 14; with map.

This is one of the convenient lists issued by the California State Mining Bureau. Previous lists have included the mines of various counties in the State. The present issue is a list of the numerous oil wells located within the territory of the city of Los Angeles. Names of the wells, the owners and other particulars are given, and it supplies all the information which any one interested in the oil exchange may desire. The State Mining Bureau is making these issues very useful, not only for local purposes, but to investors and others interested in mining industries of the State.

Transactions of the Kansas Academy of Science. Volume XVIII. 1903. Edited by G. P. Grimsley, Secretary. Topeka, Kansas; State Printer. Pages, 288; illustrated.

This volume contains the proceedings of the Kansas Academy of Science for the past year, with an historical sketch of the Society which was organized as long ago as 1868; a list of members and officers and other notes. Besides this there are a number of papers written by members during the past year, presenting valuable facts in relation to the geology, geography and natural history of the State. Among the papers on geology are included one on the economic geology of Iola and vicinity—the natural gas belt; on the physiographic divisions of Kansas, by George I. Adams; on the origin of the gypsum deposits, by R. S. Sherwin; on the Ottawa gas wells, by J. A. Yates; on the geology of Lyon County, by A. J. Smith, and on gold in Kansas, by J. T. Lovewell. The waters of the State, their origin and qualities are also the subject of interesting discussion.

Moody's Manual of Corporation Securities. Fourth Annual Number, 1903. Edited by John Moody. New York; the Moody Publishing Company. Pages, 2348. Price, $7.50.

This is the fourth yearly issue of this manual, which is gradually growing in importance and value. It contains information brought up to the latest possible date regarding all questions of American corporations, including railroads, industrial companies, telegraphic and telephone companies, banks, mines, etc. The gradual advance towards completeness is shown by the fact that in the present edition about 11,000 different companies are included, an increase of over 2,000 compared with the preceding volume for 1902. The statistics given for each company include property owned and controlled, capital and debt, dividends paid earnings and financial results obtained with the addresses of the company's offices and plants, and names of officers and directors. The statements, of course, vary in length, many being necessarily brief and condensed; while longer and more elaborate articles are given to the principal corporations. The section relating to mines is not as complete as it might be, but shows a great improvement over previous editions of the manual. Care has been exercised, apparently, in adding to the list, and in weeding out some which really had no proper place there. An evident desire has been shown to make the information as full as possible. In addition to the company items, lists are given of the membership of all the stock exchanges of the United States and Canada; statistics of American Government and State and of foreign securities; statistics of steam railroads, of electric companies, of telegraph companies and of industrial companies. An appendix treats of public lighting and other plants, operated by towns and cities. Great pains have been apparently taken to present accurate statements with regard to the trusts or industrial combinaions, and the properties which they actually include in their operations. An introductory article is given on the Choice of a Corporate Home, by Henry G. Atwater, of New York, which presents the relative advantages incorporated under the laws of different States. The "Manual" is a useful work to investors, bankers and others, and covers a wide range of information presented for the most part in their convenient form.

Stones for Building and Decoration. Third Edition, Revised and Enlarged. By George P. Merrill. New York; John Wiley & Sons. London; Chapman & Hall, Limited. Pages, 552; illustrated. Price, $5.

The first edition of this book, which appeared in 1891, was generally received as a valuable addition to our collected knowledge of the building stones of this country. The writer's experience, in preparing the extensive collection in the Natural Museum at Washington, as well as the large collection in the New York Museum, gave him opportunity for acquaintance with the quarry products of the country at large. Extensive field-work also added to his familiarity with methods of quarrying and with the use of stones. During the last 12 years there has been a very notable increase in the use of stone in this country, and in the output from American quarries. The amount of capital invested in the business, and probably the total annual output of building and decorative stone have more than doubled. As is well known to those who have attempted it, the exact statistics of the quarry business are almost impossible to obtain, owing to the great number of small workings which exist, and the constant variations in the business. There can be no doubt, however, that the use of stone has increased more rapidly than the population, and the number of buildings. This has been one result of the increase in the price of lumber and the disposition of our people, as their prosperity rose, to substitute more permanent building materials. In part also, it has been caused by the greater relative growth of the cities, in which temporary and inflammable building material is at a discount. With this growth in the business, there has come about a notable increase in the quantity and variety of machinery used. Where ten or fifteen years ago hand-labor or a few steam drills only were found at the quarries, we now find expensive machinery in the forms of drills and channelers; while the stone-cutting yards employ many pneumatic tools, such as planers, saws, grinding and polishing machinery and lathes. All of this made it necessary, in order to bring the book up to date, to rewrite some chapters and to add additional material, which the author has done in the present edition. Besides the alterations thus indicated, the chapter on Methods of Testing has been entirely re-written, and a new chapter has been added on the Use of Drift Boulders for Building Purposes. There are several new illustrations, including five maps, showing the geographic distribution to more important stones, included in this edition. The work has been materially improved. We regret to say, however, that while the plates and maps, with some of the halftone illustrations, are very good, the cuts showing machines are in many instances too small, and are not what they should be in a work of this importance.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

INJUNCTION—WATER RIGHTS.—1. The rule that this court will not interfere with the discretion of the trial judge in granting or refusing an injunction where the evidence is conflicting does not apply when the question to be decided is one of law.

2. Where, therefore, a lower riparian proprietor files an equitable petition praying for an interlocutory injunction against an upper proprietor who is threatening to interfere with the petitioner's rights in a non-navigable stream flowing through his land, by diverting part of the water above the lands of the petitioner and returning it to the stream below such lands; and where it appears from the record that the defendant, a non-resident of the State, admits the contemplated trespass and defends solely upon the ground that the diversion of the water will not damage the petitioner to any material extent, it is error to refuse the injunction (1) because the injunction would prevent a multiplicity of suits, and (2) because the injunction would restrain acts of the defendant that might with the lapse of time become the foundation of an adverse right.—Chestatee Pyrites Company v. Cavender's Creek Gold Mining Company; Superior Court for Lumpkin County, Georgia.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
Letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

Uniform Coin Values.

Sir.—Now that a commission is investigating methods of promoting steadiness of exchange among gold and silver-using countries, would it not be a good time to bring up the plan proposed by the JOURNAL years ago, to establish uniform coin values? That plan, as I recall it, was not to do away with present national coins or names, but simply to establish a uniform standard for all the leading commercial nations. That could be done by changes so slight that they would not be felt in actual current use. By such slight changes we might have uniform values, say, for the United States $5 piece; the British £1 sterling; 25-francs for France, and the countries of the Latin Monetary Union; 20 marks for Germany; 10 rubles Russian, and so on.

The establishment of such uniform values would undoubtedly prove of great assistance to trade, and the saving to merchants could only be appreciated by those of experience. The only class who would lose by it would be the small bankers—I do not mean bankers doing a legitimate financial business, but rather mere money-changers. Of course, I understand that there will always be variations in exchange; but the calculation of these on a basis of uniform values would be an extremely simple matter, compared with our present systems.

I trust that you will find opportunity to call attention again to this reform, the attainment of which ought to be comparatively easy.

TRADER.

New York, July 11, 1903.

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Bromine in Mining.—To what extent is bromine used in mining? Is there a prospect that this use will increase?

Answer.—Only a very small quantity of bromine is used in mining, by a few mills, in which the bromo-cyanide process is employed. There is no present prospect that the use will increase to any considerable extent.

Molybdenite.—Can you give me the names of parties who buy or treat molybdenite? I have made a discovery of the mineral, but have not yet proved the per cent of mineral contained.—H. B.

Answer.—Buyers of molybdenite in the East are Ash & Deninger, of Phoenixville, Pa., and the Primos Chemical Company, of Primos, Delaware County, Pa. In the West, the ores are bought and treated by A. B. Frenzel, 1540 Sherman Avenue, Denver, Colorado. The demand is not large.

Biotite.—Who can supply this mineral for commercial uses?—E. R. C.

Answer.—In further answer to this question, which was published in our issue of June 27 last, Penaloza & Co. (incorporated), whose address is 205 Security Building, St. Louis, Mo., inform us that they have large quantities of the material to dispose of, and can furnish it to buyers.

Zirconium.—In your volume, "The Mineral Industry," for 1902, you have some reference to the rare element, zirconium. We have had an inquiry from abroad for this element, and would like to obtain information. Is it found in this country, and to whom should we apply for it?—L. S.

Answer.—Zirconium is obtained, with other rare elements, in one mine in Western North Carolina. The production is controlled by the Welsbach Light Company, whose office is at Gloucester, New Jersey.

Infusorial Earth.—I have an option on a deposit of infusorial earth. Can you tell me who are large buyers? I want to ascertain the value of the material and the extent of the market.—W. R. M.

Answer.—Infusorial, or diatomaceous, earth is mined in this country near Blue Hill., Me.; Troy, N. H.; in Calvert County, Md., and at Seneca, Mo. Deposits also exist in Virginia and in Nevada. The quantity mined and sold in the United States is about 4,000 tons yearly. The chief buyers in the East are Hummill & Gillespie, 240 Front Street, New York: and L. A. Salomon & Brother, 216 Pearl Street, New York.

Fuller's Earth.—We have received from Italy an inquiry as to whether there is any concern in the United States making aluminum-magnesium hydrosilicate for oil-refining purposes. Can you tell us anything about the article?—P. M.

Answer.—Your correspondent probably refers to what is usually known as fuller's earth, which is a hydro-silicate of alumina, carrying usually some magnesia. It is used largely in refining oil. It is not made in this country; in fact, it is not made, or manufactured, at all, being a natural product. It is found in several localities in the United States, the most important deposits being near Quincy, Florida. These are controlled by the Standard Oil Company, which uses a large quantity of the material.

PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared.

Week ending July 7, 1903.

732,707. COMPOSITION OF MATTER USED FOR PROTECTING THE WALLS OF RETORTS, ETC.—Thomas J. Carlton, Iola, Kan. Composition of matter consisting of water, cobalt, black lead, burnt powder of fire-clay, and saltpeter.

732,708. PROCESS OF EXTRACTING GOLD FROM ORES.—Henry R. Cassel, New York, N. Y. A step in the process of extracting gold from ore which consists in treating the ore with a bromin solution to form dissolved gold and bromide, mixing bromate with an acid, and causing said mixture to act upon the dissolved gold and bromids so as to set free the bromine of the bromides and bromate.

732,709. APPARATUS FOR EXTRACTING GOLD FROM ORES.—Henry R. Cassel, New York, N.Y. In an apparatus for extracting gold from ore, the combination of a gold vessel with an inclosed solution-distributer arranged within the uper part of the vat above the ore-level, a pair of tanks, and pipes that lead from said tanks to said distributer.

732,713. STEAM-PUMP.—Fred D. Clinger, Owatonna, Minn., assignor to the Washington Tool Company, Owatonna, Minn. In a pump, the combination with a frame and a piston-rod, of a crank-disk having on one face a wrist-pin, and on its other face a valve-actuating cam, a pitman connected to the wrist-pin of said crank-disk and to said piston-rod, and a valve-stem having a projection subject to the cam of said crank-disk.

732,732. PROCESS OF MAKING LITHOPHONE AND GLAUBER SALT.—William D. Gilman, Baltimore, Md. Herein described process of manufacturing lithophone and Glauber salt, which consists in adding to a solution of niter-cake an excess of zinc and adding a proper proportion of solution of barium sulphate, from which lithophone is precipitated and Glauber salt left in solution.

732,753. ELECTROLYTIC MANUFACTURE OF CHLORATES AND PERCHLORATES.—Pierre Lederlin, Chedde, France. A process of manufacturing chlorates at a high constant electrochemical yield by electrolyzing a solution of a corresponding chloride without previous addition of chromate or bichromate and without a diaphragm between the anode and cathode, and maintaining the electrolyte continuously non-alkaline during electrolyzation by suitable addition thereto of hydrochloric acid.

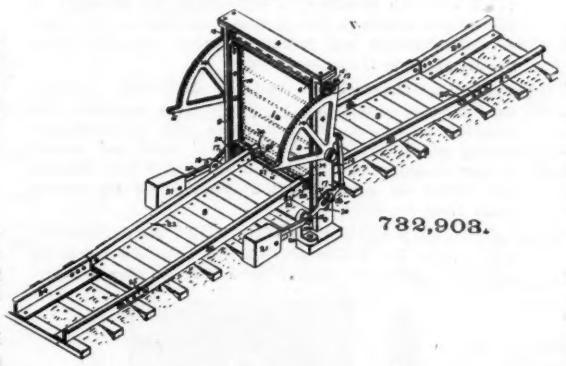
732,756. GAS PURIFIER.—Ernest F. Lloyd, Detroit, Mich. The combination with two gas-purifiers arranged side by side with an intervening space, of two crossovers in alinement with each other connecting by oppositely-disposed tranverse pipes communicating with suitable inlet and outlet openings in the adjacent sides of the purifiers across the intervening space, an intermediate portion in each of said cross-overs being arranged parallel with the sides of the purifiers, and a group of three valves in each of said intermediate portions symmetrically arranged in each group in alinement with each other each having an upwardly-projecting stem extending into the space above the cross-overs the central valve of each group controlling the flow of gas through the crossovers and the end valve respectively controlling an inlet and an outlet port into the crossover through which the said crossover is adapted to be connected with independent inlet and outlet pipes extending lengthwise in the space beneath the crossovers.

732,829. MACHINE FOR FORMING TUBES OF SOFT METAL.—Wallace S. Clark, Schenectady, N. Y., assignor to General Electric Company. The combination with a ram and a pedestal, of a plunger, a die-block mounted on the pedestal, a bushing screwed into said die-block, a flanged bolster supporter on said bushing, and a die resting on said bolster.

732,843. METHOD OF PREPARING ELECTROLYTES.—William Gardiner, Chicago, Ill., assignor to Northwestern Storage Battery Company, method of accumulating an excess deposit of a metal upon an electrode by repeatedly charging a cell containing in solution an oxide of the metal and a caustic alkali and replenishing the oxide in the solution between successive charges, then when sufficient of the metal has been deposited replenishing the cell with a solution of the pure caustic-alkaline solution.

732,857. SHEET METAL-PIPE FORMER AND GROOVER.—Martin L. Hunker, Canton, Ohio, assignor, by mesne assignments to The Pipe Machine and Manufacturing Company, Philadelphia, Pa. In a sheet-metal-pipe, a mandrel, a forming die below and a forming blade on one side and a locking blade on the other side above said mandrel, a shaft, cams on said shaft, and bars and toggie-levers connecting said cams and said die and blades respectively, the cams and levers being arranged to operate the die and blades successively toward and then successively away from the mandrel.

732,903. MINE-CURTAIN.—Albertus O. Slentz, Canton, Ohio, assignor of one-half to Edward A. Langenbach, Canton, Ohio. The combination of a curtain, a roller on which the curtain is hung, cog-pinions on the roller, depressible platforms on each side of the curtain, a bar projecting on each side at the junction of the platforms beneath the roller, rotatable hubs at the sides of the platforms, levers on the hubs having longitudinal slots receiving the ends of the bar, counterbalancing-weights on the hubs, cog-wheel sections pivoted between the roller and the bar and meshing with the pinions, and pitmen connecting the sections with the free ends of the levers.



732,903.

732,866. CONTINUOUS HEATING-FURNACE.—Robert B. Kernohan, Pittsburg, Pa. In a continuous heating furnace the combination with a charging-opening and a discharging-opening, of a main track for supporting a row of billets thereon, means for moving the billets on the main track, a supplemental track in communication with the main track and at an angle thereto over which the leading billet of said row is caused to travel by gravity, a movable stop arranged to be moved into and out of the path of travel of the billet on the supplemental track, and means for operating the movable stop.

732,867. HOT BLAST STOVE.—Andrew C. Kloman, Saxton, Pa. In a hot-blast stove, a preliminary combustion-chamber, a second combustion-chamber communicating therewith and completing therein the combustion begun in the preliminary chamber, and stove-heating flues leading from the second combustion-chamber only through which the products of combustion pass, said combustion-chamber having individual means for supplying air thereto.

732,894 and 732,895. WATER-PAINT.—Samuel S. Ruston and Benjamin Ruston, Syracuse, N. Y. Composition consisting of milk albuminoid, oily substances, lime, alumina hydroxide and calcium sulphate.

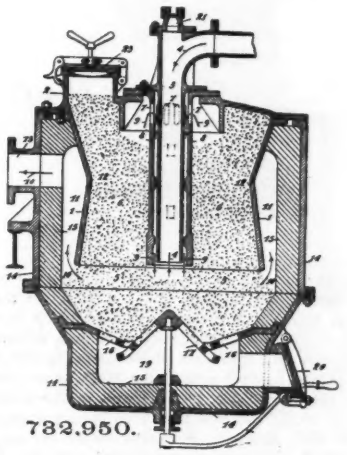
732,923. COAL-HANDLING MACHINERY.—Thomas A. Coffin, West New Brighton, N. Y. In a hoisting and conveying apparatus, the combination of a bucket-trolley having a sheave over which the hoisting-rope passes with a counterbalancing trolley also having a sheave over which said rope passes, and a rope connected to the structure and to the bucket-trolley and passing over the sheave on the counterbalancing-trolley in opposition to the strain thereon of the hoisting-rope.

732,925. OIL-WELL DRILL.—Harry R. Decker, Beaumont, Tex. The combination with a rotary drill-pipe, and a well-casing closed at the top and provided with a lateral opening, of means for securing the drill-pipe within the well-casing to prevent the former from being blown out of the latter.

732,937. PROCESS OF REFINING OIL.—Charles B. Graham, South Haven, Mich. Process of purifying oil, consisting in passing the same through a compound of lime-water, pyrogallic acid and caustic potash.

732,939. REGENERATIVE APPARATUS.—James A. Herrick, Philadelphia, Pa. In a regenerative apparatus, a reversing-valve common to two regenerators, said valve being disposed so as to simultaneously direct the incoming cold air through one set of regenerators and the hot gases from the furnaces through the other set of regenerators.

732,950. GAS-PRODUCER.—André Leclere, Paris, France, assignor to Société Anonyme pour la Production et Emploide la Vapeur Surchauffée, Châin-sur-Saône, France. A gas-producer comprising a suitable chamber having a closed upper end and a gas-outlet, an inner depending wall forming a coal-receiver, an air blast pipe depending centrally in said coal-receiver, and a tube or pipe inclosing said air-blast pipe and forming an annular space between said tube and blast-pipe, said annular space communicating with the coal-receiver at the top and terminating at the bottom in proximity to the end of the air-blast pipe whereby gases arising from the material in the receiver are drawn down through said annular space and discharged at the lower end to form a protecting zone around the end of the air-pipe.



732,950.

732,960. DIE FOR THE MANUFACTURE OF METAL TUBES OR PIPES.—Jacques Reimann, Plasmarl, near Swansea, England. A die for the manufacture of conical bodies, comprising a die-plate, an expansible die-ring therein, wedges adapted to hold said ring within the plate, and means to move said wedges through the die to permit the expansion of the ring.

732,979. ARTIFICIAL FUEL.—Mary F. Ward, Providence, R. I. An artificial fuel composed of coal-ashes, sawdust, sand, paraffin-wax and sodium nitrate.

732,986. STONE-SAWING MACHINE.—John P. Winter, City Island, N. Y., assignor to Henry C. Cummings, New York, N. Y. In a stone-sawing machine, a frame, a crank-shaft mounted therein, a vertically-arranged saw-sash-operating bar unconnected with the frame, a support between said bar and said shaft, vertically-arranged levers connected with said support and arranged one above another, the upper end of the upper lever and the lower end of the lower lever being connected with said bar by means of links, and rods connected with said crank-shaft and with the adjacent ends of said levers.

733,000. PROCESS OF OBTAINING SULPHITE OF ZINC FROM COPPER SLAG.—Ferdinand Brünjes Langelsheim, Germany. A process of treating slags containing zinc oxide and barium, iron and calcium sulphite, which,

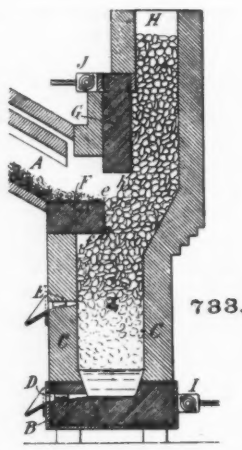
consists in treating the finely-ground slag with sufficient dilute hydrochloric acid to convert the iron, barium and calcium into chlorids, liberate hydrogen sulphite and thereby precipitate the zinc as sulphide.

733,017. APPARATUS FOR MAKING PHOSPHORUS.—Robert K. Duncan, Pottstown, Pa., assignor to General Chemical Company, New York, N. Y. Apparatus for producing phosphorus, consisting of the combination with a suitable electric furnace adapted to heat the phosphatic materials intensely, of a phosphatic-decomposition chamber for treatment of the phosphid with water, a storage-tank for the phosphide evolved, a drying-chamber connected with storage vessel, a heating-chamber for decomposing phosphine, and a suitable receiver connected with said heating-chamber, to receive the products of decomposition.

733,028. ELECTROLYTICALLY COATING IRON WITH ZINC.—Emanuel Goldberg, Moscow, Russia. A process of electrolytically coating iron, which consists in passing an electric current through the iron as a cathode in the presence of a zinc anode and an electrolyte containing a compound having nitrogen bound to an organic radical.

733,036. COKE-OVEN-OPERATING APPARATUS.—Philip B. Hasbrouck, Pittsburg, Pa. A coke-oven-operating apparatus comprising, a movable supporting structure, a pusher or ram carried on said structure, screw-shafts, means for actuating the screw shafts, means mounted on the screw-shafts arranged to travel thereon, said pusher or ram flexibly connected with said latter means.

733,040. ELECTRIC FURNACE.—Paul L. T. Heroult, La Praz, France. An electric furnace comprising a well of refractory material in which is effected reduction of ore, means for introducing ore into the furnace at a temperature so high as to bring it to at least a pasty condition,



733,040.

an electric terminal in the forms of a carbon crucible at the bottom of the furnace, and a terminal in the form of a carbon block at the top, a passage being provided for the supply and maintenance of a column of coke or like fuel between said terminals, the electric current being conducted to the crucible and to the block above, and passing through the coke which fills the well of the furnace below the upper block, the fuel thus constituting a real electrode which is used up as the reduction of the ore goes on, this flowing electrode being constantly fed with fuel introduced through said passage.

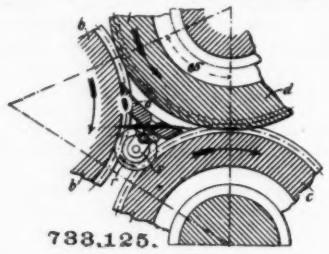
733,047. PROCESS OF MANUFACTURING HYDRATE OF CALCIUM PEROXIDE.—George F. Jaubert, Paris, France. A process of manufacturing hydrate of calcium peroxide, which consists in treating milk of lime with a solution of hydrate of sodium dioxide, agitating during presence of any appreciable amount of hydrate of sodium dioxide in the solution, then filtering the hydrate of sodium dioxide effected, then washing with water and finally drying the same.

733,073. MEANS FOR CUTTING COAL, ETC.—Hubert V. Neukirch, Zwickau, Germany. In coal-mining machinery the combination with a tool adapted to operate across the face of the working, cars in side galleries, a motor on one of the cars, a pulley on each car, a cord around the two pulleys and carrying the tool, a double-crank shaft, connections between the cranks and the tool, and a pulley and weighted cord for each car for drawing the cars into the galleries.

733,082. COMPOUND FOR ABRADING-TOOLS.—Keizo Sakurai, San Francisco, Cal. In combination an abrasive substance in comminutive form, a silicate of an alkali metal, and a suitable binder whereby the undue tendency of the other two elements to expand or contract unduly when combined alone and subjected to red heat, is obviated.

733,112. PROCESS OF REDUCING HOT METAL BARS INTO SHEETS.—Thomas V. Allis, Bridgeport, Conn. A process of reducing metal bars into sheets in a heated state, which consists in, first, reducing the bars into plates by passing the bars singly between pairs of rolls in tandem train, second, rolling the plates thus produced singly between a single pair of rolls, third, making said plates into a pile or pack and reducing the plates therein into sheets by rolling the pile or pack between a single pair of rolls.

733,125. THREE-ROLL CRUSHING-MILL.—Jacobus J. E. Bekker, Amsterdam, Netherlands. The combination in a crushing-mill, of a frame, a plurality of pressing-rollers

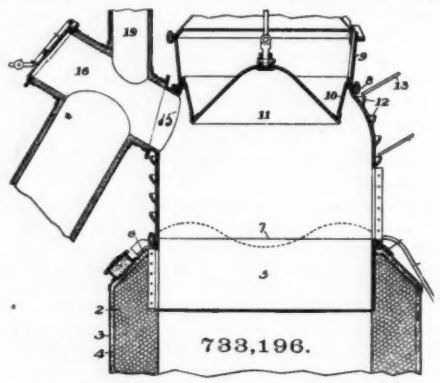


733,125.

mounted to revolve in said frame, a returner-bar in proximity to one of said rollers, and wheels on said returner-bar that turn on the preiphery of said last mentioned roller and on the periphery of the next succeeding roller.

733,133. CEMENT-TESTING MACHINE.—Joseph W. Bramwell, Philadelphia, Pa. The combination in a testing apparatus having clamps for holding a piece to be tested, of a scale-beam provided at one end with a valve receptacle for containing shot or other weighing units and at the other end with a counterweight for said receptacle, and means supported independently of the scale-beam and placed to be operated by motion of a clamp for moving the valve of the receptacle when the test-piece breaks.

733,196. BLAST-FURNACE TOP.—George K. Hamfeldt, Munhall, and Torsten A. Tesch, Swissvale, Pa.



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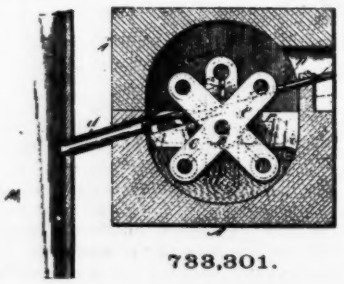
A blast-furnace having an annular metal shell projecting above its masonry and having a contracted upper portion, a hopper supported on the contracted portion, and an outer annular cooling device for said shell.

733,299. EXTRACTING APPARATUS.—Emanuel Heimann, Brunswick, Germany. An extracting apparatus comprising a jacket-casing; a receptacle therein, the upper end of which is closed normally; an evaporator and a condenser; said receptacle communicating with said evaporator; said evaporator with said casing; said casing with said condenser and said condenser with said receptacle.

733,206. CENTRIFUGAL GAS-PURIFIER.—Herbert A. Humphrey, Westminster, London, England. A centrifugal apparatus for purifying gases, comprising a casing divided into two chambers, a centrifugal fan arranged in one of said chambers, and partitions arranged in the other of said chambers and forming channels extending from the periphery to the center thereof.

733,253. LADLE-TRUCK.—Malcolm McDowell, Chicago, Ill. A device comprising a portable truck provided with weighing mechanism, in combination with a bottom-pour casting or distributing ladle supported upon and carried by the weighing mechanism and forming a part thereof, and means for controlling the discharge of the molten metal from the ladle.

732,301. QUICKSILVER-FEED FOR AMALGAMATORS.—John W. Swearingen, Gaston, Cal. An automatic feed for quicksilver, comprising a case forming a reser-


733,301.

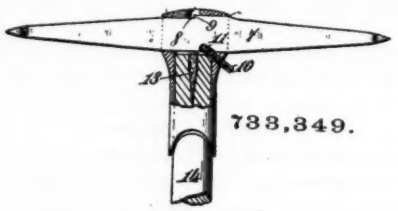
voir, a shaft bearing rotating arms having buckets in their ends and an inclined trough having a spout at one end, a handle at the other and a blade or lip adapted to be juxtaposed to the arms.

733,308. MANUFACTURE OF MATERIAL FOR USE IN THE PRODUCTION OF PIGMENTS.—Luis Wirtz, London, England. A process of manufacturing a material for use in the production of pigments, which consists in soaking slag in a chloride solution, separating the liquid therefrom, treating said liquid with a sulphate solution and separating the resulting precipitate.

733,316. PROCESS OF MAKING PHOSPHORUS.—Robert K. Duncan, Washington, Pa., assignor to General Chemical Company, New York, N. Y. A process of producing phosphorus, which consists in subjecting phosphatic material to the decomposing action of an electric current and producing phosphides, and subjecting said phosphides to the action of water and producing phosphorus hydrides, and finally dissociating the latter by the action of heat.

733,338. BRICK MACHINE.—Horace G. Smith, Detroit, Mich., assignor of one-third to John J. Allay, Detroit, Mich. The combination with a series of molds having a separable bottom portion, of stationary extraction and compression dies adjacent one to the other, and means whereby the molds may be moved into contact with said dies to simultaneously compress the plastic material in one mold and extract the compressed block from the other.

733,349. MINER'S PICK.—Alexander Walker, What Cheer, Iowa, assignor to What Cheer Drill & Miners Tool Co., What Cheer, Iowa. In a pick, a socket having an eye com-



733,349.

bined with a blade removably extending through said eye, provided with a single shoulder substantially centrally of its length, said eye having interiorly a coacting and single shoulder located substantially centrally thereof, and means for holding the shoulder of the blade against that of the eye.

733,355. STORAGE APPARATUS.—James M. Dodge, Philadelphia, Pa., assignor to the Dodge Coal Storage Company, Naugatuck, Conn. The combination in an apparatus for piling material, of a movable frame, a hopper carried by the frame, guides on the frame for the means for feeding the hopper, and a conveyer on the apparatus arranged to receive material from the hopper.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

Week Ending June 20, 1902.

8,693 of 1902. TREATING TIN-SCRAP.—C. D. Brundley, London. An improved method of treating the iron of tin scrap for the production of iron oxide pigments.

14,739 of 1902. ELECTROLYTIC APPARATUS.—T. Ewan, Glasgow. In the electrolysis of a fused sodium hydrate to produce metallic sodium, the use of diaphragm composed of aluminum or sodium aluminate or a mixture of both.

14,982 of 1902. BINDING MATERIAL FOR BRIQUETTES.—J. R. Down, Swansea. The use of sago as an agglutenant to bend into briquettes zinc ores and coal for the distilling furnace.

15,117 of 1902. ROCK-DRILL.—H. Collins, Johannesburg, Transvaal. Improved method of fastening drills in the chucks of rock drilling machines.

15,291 of 1902. SAFETY-STOP FOR MINE CAGES.—B. Stirrup, Leigh. Improved mechanism for preventing the fall of mine cages on the breakage of hauling rope.

15,673 of 1902. ROCK-DRILL.—W. O. Wood and J. H. Miller, South Hetton. Detailed improvements in rock boring machines, in the method of mounting the drill and in the machine itself.

16,646 of 1902. PURIFYING BLAST-FURNACE GASES.—L. Keyling, Berlin, Germany. Devices for cooling the gases coming from the blast furnaces and for catching the dust.

19,981 of 1902. LEAD PIGMENT MANUFACTURE.—Union Lead & Oil Company, New York, U. S. A. Rotary beaters for communicating metallic lead into a fine uniform powder suitable for cerrosion processes for the production of pigments.

27,122 of 1902. BLAST-FURNACE.—H. A. Jones, New York, U. S. A. Improvements in blast furnaces for introducing raw ore below the zone of reduction so as to produce an iron containing less carbon.

2,577 of 1903. JAW CRUSHER.—C. E. Jeffcock and W. H. Yardley, Sheffield. Method of making jaw crushers yield, if anything extra hard gets in, so as not to crack the crushing surfaces.

4,094 of 1903. STEEL MOLD.—F. E. Parks, Duquesne, U. S. A. An open mould placed in the pit below the tap of open-hearth furnaces, to catch the drip of metal that takes place after the furnace has been discharged through the tap-hole.

7,918 of 1903. MINERS' PICK.—J. Price, Rhondda. Improved method of fixing removable heads of picks.

TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of THE ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL and making its office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and to be of any service to them that they can.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers non-resident in Great Britain, the privilege of free use of the Institution offices and library in Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution and thus enjoy the advantages of temporary office accommodation in the city of London.

PERSONAL.

Mr. Ernest Levy has returned to Denver.

Mr. J. D. Audley Smith is at Valdez, Alaska.

Mr. Edmond Skinner, of Denver, was in New York last week.

Mr. S. C. Rudra has returned to London from Ceylon.

Mr. William Knox has returned to Melbourne from London.

Dr. F. L. Bartlett, of Denver, is now in New Mexico.

Mr. John F. Allen, of Mexico, sailed for London on July 15.

Mr. Ernst du B. Lukis is at the American Club, Mexico City.

Mr. Barry Searle, of Montrose, Pa., has returned from Georgia.

Mr. Frederick S. Harris is in Sonora, Mexico, examining mines.

Mr. J. W. Mercer is at the Liberty Bell Mine, at Telluride, Colo.

Mr. Uri B. Curtis, of Tonopah, Nev., is visiting New York City.

Mr. E. F. Shinn has moved from Los Angeles to New York City.

Mr. Albert E. Chandler has been appointed State engineer of Nevada.

Mr. Ben S. Revett, of Breckenridge, Colo., leaves shortly for Atlin, B. C.

Mr. George W. McElhiney, of Guanajuato, is visiting New York City.

Mr. W. G. Nebeker, of Salt Lake, Utah, has gone to Mexico to examine mines.

Mr. John C. Montgomery and Mr. D. H. Moffat, of Denver, are at the Waldorf.

Mr. C. P. Collins has returned to Bradford, Pa., from a business tour to Denver.

Mr. John W. Finch, of Denver, is at Butte, Mont., acting as expert in mine litigation.

Mr. George R. Hancock is now manager of the Comstock Mine at Park City, Utah.

Mr. E. W. Griffiths, of Salt Lake, is examining mining properties near Tonopah, Nev.

Mr. C. L. Dignowity, of Philadelphia, will remain at Boulder, Colo., until September 5.

Mr. Benjamin T. Lloyd, of Salt Lake City, recently visited Duluth and Minneapolis.

Mr. Woolsey Johnson, of Hartford, Conn., has gone on a metallurgical tour of the West.

Mr. T. E. Schwarz leaves Denver this week for Park County, Colo., on professional work.

Mr. Ben. B. Lawrence has returned from Nova Scotia, and has gone to Parry Sound, Ontario.

Mr. J. F. Hetchman, president of the Globe Copper Company, of Arizona, is in New York City.

Mr. G. C. Martin, of the United States Geological Survey, sailed recently from Seattle for Alaska.

Mr. Gordon Land, of Denver, Colo., is now in charge of the Keystone Placer at Telluride, Colo.

Mr. J. W. Truscott has resigned as superintendent of the South Eureka Mine, Amador County, Cal.

Mr. Richard H. Lee, formerly with the Colorado Fuel and Iron Company, is now at Harrisburg, Pa.

Mr. J. H. Allen, metallurgist, has gone to Santiago de Cuba on professional business during July.

Mr. T. L. Dawson is manager of the Wei-Hai-Wei Gold Mining Company, at Wei-Hai-Wei, China.

Mr. M. E. Hiltner, of Lincoln, Neb., is metallurgist of the Wasp No. 2 property, near Deadwood, S. D.

Mr. John B. Farish returned to Denver from Mexico a few days ago, and left soon after for New York.

Mr. Philip M. Collins, superintendent of the Portland chlorination mill at Colorado City, Colo., has resigned.

Mr. William H. Martin, superintendent of the Sierra Queen Mine at Nevada City, Cal., has resigned.

Mr. J. J. Brooks, formerly superintendent of the Bannie Mine, near Prescott, Ariz., will go to California.

Mr. C. E. Knox, manager of the Montana-Tonopah Mine, was at Philadelphia recently on mining business.

Mr. A. W. Tucker is manager of the Seaboard Copper Company in the Virgilina District, North Carolina.

Mr. Simon Bamberger, manager of the Bamberger-De La Mar Mines, has gone to Los Angeles, Cal., on business.

Mr. H. W. Turner, of San Francisco, has gone to Siskiyou and Del Norte counties, Cal., to examine gold mines.

Mr. W. D. McDougall, mining engineer, left Seattle recently for Dunkwa, Gold Coast Colony, South Africa.

Mr. F. L. Sizer, of Helena, Mont., has returned from a visit to Chicago and Cleveland. He is now at Denver, Colo.

Mr. D. M. Nichols has been appointed superintendent of the new leaching plant being erected at Salida, Colo.

Mr. Winthrop W. Fisk, of Boston, has returned from the examinations of gold mines in the State of Sinaloa, Mex.

Mr. Arthur S. Dwight, consulting engineer to the Greene Consolidated Copper Company, has gone to Cananea, Mex.

Mr. G. K. Fisher, consulting engineer of the Utah Consolidated Gold Mines, visited Colorado Springs, Colo., recently.

Mr. L. M. Cokerell, of the Anglo-Mexican Mining Company, Guanajuato, sailed for London last week on the *Teutonic*.

Mr. A. J. McCone, of Harron, Rickard & McCone, of San Francisco, Cal., has been to Tonopah, Nev., on business.

Mr. Charles Taylor, of Nogales, has returned from Washington Camp, Ariz. He leaves for Honduras at the end of July.

Mr. Charles Briggs, of Calumet, Mich., president of the Calumet & Arizona Mining Company, was in Chicago last week.

Mr. Robert T. Hill, of Washington, has returned from Tombstone, Ariz., and sailed on July 17 on the *Etruria* for London.

Mr. Walter Bunce, general superintendent of the Ferris-Haggarty Copper Mine at Encampment, Wyo., has gone to Boston.

Mr. W. Bardi, a mining engineer in the employ of the Hungarian Government, has been visiting the Cripple Creek District.

Mr. George R. Wood, of Pittsburg, is consulting engineer to the United States Coal and Coke Company, of West Virginia.

Mr. A. F. Grigsby has resigned as superintendent of the mines at Rosario, Sinaloa, Mex., and is succeeded by Mr. J. Bradbury.

Mr. G. H. Robinson, manager of the Tintic Mining and Development Company, has returned to Salt Lake City from Chicago.

Mr. Frank H. Clark, of Salt Lake, Utah, is now manager of the Trade Dollar Extension Mining Company at Silver City, Idaho.

Mr. Juan F. Brandes, of Denver, has been appointed consulting engineer to the Trans-Continental Mines at Georgetown, Colo.

Mr. G. W. Rockwood has been appointed superintendent and metallurgist of the new smelting plant being erected at Butte, Mont.

Mr. Raymond F. Walter, of the United States Geological Survey, is making investigations relative to irrigation in the Black Hills.

Mr. H. W. Hardinge, of Denver, reached New York from London on the *Philadelphia* on July 11. He leaves for Canada forthwith.

Mr. Herbert Kilburn Scott, of London, who returned from Brazil a short time ago, has left for the Caucasus on professional business.

Mr. W. H. Aldridge, manager of the Canadian Smelting Works at Trail, B. C., has returned from a visit to Ottawa and Montreal, Can.

Mr. L. N. White, of New York, is now at Durgy, N. C., directing the operations of the Person Consolidated Copper and Gold Mines Company.

Prof. Alvin Phillips, late of Denver, Colo., is now in charge of the affairs of the Lexington Hill Gold Mining Company, at Deadwood, S. D.

Mr. F. W. Robertson, provincial mineralogist of British Columbia, left Victoria for East Kootenay recently to inspect the Flathead coal-fields.

Mr. R. W. Rodda, of Seattle, is now at Eugene, Ore. He will also examine mines near Baker City, and expects to return to Seattle by July 20.

Mr. Rees C. Vidler, general manager of the Trans-Continental Transportation and Mining Company, returned from New York to Colorado recently.

Mr. George H. Gibson, recently with the B. F. Sturtevant Company, of Boston, is now connected with the International Steam Pump Company, New York.

Mr. Bradley Stoughton, of New York, will spend the greater part of July in Colorado, in charge of the summer school of metallurgy of the Columbia School of Mines.

Mr. John P. Casey, of Cananea, Mex., has returned from the Yaqui River country. He is manager of the Santo Domingo Mine for Mr. W. C. Greene.

Mr. William Scallon, of Butte, president of the Anaconda Mining Company, visited in Hancock, Mich., recently, the guest of his brother, Dr. J. E. Scallon.

Mr. Hudson H. Nicholson, mining engineer, of Denver, returned there from New York last week, and after a professional visit to Leadville, will leave for Sumpter, Ore.

Mr. S. S. Fowler, of Nelson, B. C., has been appointed consulting engineer of the Idaho-Alamo Consolidated Mines, Limited, an offshoot of the Scottish Colonial Gold-fields, of Edinburgh.

Mr. Charles M. Hampson, engineer to the Colorado Iron Works, has been in charge of the erection of a new stamp mill for the Yankee Consolidated Mining Company at Yankee Hill, Colo.

Mr. L. G. Elkins, superintendent of the American Smelting and Refining Company's Philadelphia plant at Pueblo, Colo., has been appointed assistant general manager, with headquarters at Denver.

Mr. J. Walter Wells, connected for the past five years with the Provincial Bureau of Mines of Ontario, Canada, has joined the mining staff of the Lake Superior Power Company, Sault Ste. Marie.

Mr. T. A. Mosman, superintendent of the American Smelting and Refining Company's Eilers plant at Pueblo, has been transferred to the Leadville plant, while Mr. George A. Marsh becomes superintendent of the Eilers plant.

Mr. T. J. Jones, for the past five years consulting mining engineer for the Stokes' interests, at Austin and Berlin, Nev., has accepted a position as superintendent of the mines of the Mountain Copper Company, at Iron Mountain, near Keswick, Cal.

OBITUARY.

J. A. Dean, a well-known mining man of Cripple Creek, Colo., and for several years assayer at the Anaconda Mine, died on July 3, after a short illness.

Augustus E. W. Painter died July 4, at Allegheny, Pa., at the age of 60 years. Mr. Painter was formerly a wealthy iron manufacturer of Pittsburg, but retired from active business after the absorption of his company by the American Steel Hoop Company.

Amos H. Fowler died at his summer home, Hyannisport, Me., a short time ago. Mr. Fowler came to Colorado in 1877, and was a pioneer smelter man of the Leadville District, having had charge of the Berdell & Wetherill Smelter, one of the first smelting plants constructed in the State.

Frank M. Brown, of Asbury Park, N. J., died in the hospital at Beaumont, Tex., July 12. Mr. Brown was a prominent operator in the Texas oil fields, and previously had worked in the West Virginia field. He was a graduate of West Point, and served as a civil engineer in the Spanish-American war, with the rank of major.

Col. George Church died at his home in Great Barrington, Mass., June 27. He was born in Connecticut in 1826. During the war he was part owner of the Richmond Iron Works Company, and later was interested in the Lenox Iron Furnace Company, Lenox, Mass., the Ramapo Wheel Foundry Company and other industries.

Charles C. Martin, consulting engineering of the Department of Bridges, of New York City, died suddenly at Far Rockaway, July 11, at the age of 72 years. Mr. Martin was born at Springfield, Bradford County, Pa. His name will always be most closely associated with the Brooklyn Bridge, the construction of which he supervised, and which he cared for until his death.

Thomas Chalmers, a native of Scotland, and a pioneer of Chicago, died July 13, after a long illness. He was one of the founders of the firm of Frazer & Chalmers, now a constituent part of the Allis-Chalmers Company, one of the largest and most important manufacturers of mining and other machinery in the world. Mr. Chalmers was born at Dronley, near

Dundee, Scotland, in 1816. He learned the machinery business at Dundee, and came to America in 1843, and for a time worked as a journeyman machinist. He built Chicago's first water works, installed the first steam heating apparatus, and was one of the engineers of the old Illinois & Michigan Canal. Mr. Chalmers belonged to the Order of Masons and Odd Fellows. He was a business associate of R. W. Gates for about 30 years, and in 1855 assisted in organizing the firm of Gates, Warner, Chalmers & Fraser. In 1871 the firm of Fraser & Chalmers was incorporated, and in 1901 Mr. Chalmers retired. Subsequently the Allis-Chalmers Company was formed.

SOCIETIES AND TECHNICAL SCHOOLS.

INTERNATIONAL GEODETIC ASSOCIATION.—Dr. O. H. Tittmann, superintendent of the United States Coast and Geodetic Survey, will sail for Europe on the *Blucher* July 23 to represent this Government at the conference of this Association to be held in the Danish Parliament Building at Copenhagen, on August 4. The object of the Geodetic Association is to secure international co-operation in the measurement of the figure of the earth.

INDUSTRIAL NOTES.

The old steel plant known as the Henderson Steel Works, at North Birmingham, Ala., has been purchased by the Union Iron and Steel Company.

The Fundicion de Metales Company, of Durango, Mex., will enlarge its Durango plant instead of removing it to Torreon, as was contemplated previously.

The Anderson Steel and Wire Company, of Anderson, Ind., has closed its mills for about a month in order to make improvements and install new machinery.

The S. M. Jones Company, of Toledo, O., recently purchased 15.5 acres of ground, upon which they will soon erect a steel and brick plant for the manufacture of gas engines.

The house of Arthur Koppel, of 66-68 Broad Street, New York City, has secured an order from one of the large trunk lines for about 10,000 tons of heavy steel rails for the Pacific Coast.

The new power house of the Tennessee Coal, Iron and Railroad Company, of Ensley, Ala., is completed and will increase the capacity of the rail mill and steel plant by about 20 per cent.

The Incandescent Light and Chemical Company is erecting a plant at Youngstown, O., for the manufacture of nitrate of thorium, a substance used in the mantles of Welsbach lamps.

The Ottumwa Box Car Loader Company has opened at Chicago, Ill., an office in the Old Colony Building, Room No. 1225. Ira E. Stevens, the company's sales agent, will have charge.

The Hallidie-Painter Tramway Company, of San Francisco, Cal., recently shipped to Montana a double rope tramway of the latest improved design, 6,000 ft. long, and of 12 tons hourly capacity.

Van Voorhis & Sanford, of Monterey, Mex., report that the Cerveceria Cuauhtemoc, of the same city, has placed an order with them for two more Heine Safety Water Tube Boilers of 250 h.p. each.

The Eastern Steel Company, of Pottsville, Pa., will build two more open-hearth furnaces in addition to the four now under construction, thus increasing the estimated output of steel from 125,000 to 175,000 tons annually.

The Standard Engineering Company, of Cleveland, O., recently incorporated, will carry on a general contracting and engineering business, especially of electric railway construction, power and lighting plants, development of water power, etc.

The Union Iron and Steel Company has acquired the business of the Big Stone Gap Iron Company and assumed all liabilities, contracts, etc. There will be no change in the management of the Big Stone Gap Plant, and the business will be conducted as heretofore under the name of Union Iron and Steel Company.

The Columbia Engineering Works, Incorporated, William and Imlay streets, Brooklyn, have taken up the manufacture of the Herschmann patent steam wagons, building 3-ton and 6-ton trucks, in connection with which an automobile department has been established and the shops equipped with additional tools specially adapted for this work.

The Pickards-Magee Coke Company has established headquarters at 1210-11 Frick Building, Pittsburg, Pa. The company does not intend to manufacture coke, but will devote its attention to handling the product of the smaller operators in the Connellsville and adjacent districts.

Attention is called to the fact that the Fuerst Brothers Company, 2 Stone Street, New York City, will continue to act as the American agents for the Hoepfner electrolytic processes, particularly for zinc, which have recently been acquired by the Gesellschaft fur Metallelectrolyse mit Beschrankter Haltung, of Siegen, Germany.

The Republic Iron and Steel Company has closed the bessemer steel plant at Youngstown, O., for the installation of a new blooming mill, converters and a new engine. The blooming mill is to be furnished by the Lloyd-Booth plant, of Youngstown; the converters by the Engineering Company, of New Castle, Pa., and the engine by the William Tod Company, of Youngstown.

The Mexican Light and Power Company, New York offices, No. 29 Broadway, is preparing to let contracts for the initial equipment of its plant at Necaru, Mex., from which place it is intended to transmit power to Mexico City, 90 miles distant. About 28,000 h.p. is to be the initial capacity of the hydroelectric plant. James Ross, of Toronto, Canada, is president, and F. S. Pearson, of New York City, vice-president.

The M. Garland Company, of Bay City, Mich., has just shipped to the Menzel Box Company, of Dyersburg, Tenn., a 200-ft. sprocket chain conveyer, using No. 450, also an 8-spout Garland patented fuel feeder to be used for firing a battery of four boilers in the company's big plant at Dyersburg, Tenn. These fuel feeders do away with the usual large force of firemen, and was one of the first of the labor-saving appliances manufactured by the M. Garland Company, which now builds a complete line of sawmill and conveying machinery, and which claims to have the best band mill in the world.

The United Iron Works Company, with headquarters at Springfield, Mo., is a consolidation of the business and property interests of the Crescent Iron Works, and the Sterling Iron Works, of Springfield, Mo.; of the Aurora Foundry and Machine Works of Aurora, Mo., and Iola, Kan., and a purchase outright of the plant and stock of the Pittsburg Foundry and Machine Company, of Pittsburg, Kan. The officers of the new company are: C. H. Cole, president; H. T. Hornsby, vice-president and general manager; R. P. Bowyer, secretary; A. C. Daily, treasurer; C. C. Mathey, general superintendent, and A. M. Fowler, assistant general superintendent.

TRADE CATALOGUES.

P. T. Taylor & Co., of San Francisco, Cal., makers of spur, bevel, worm and spiral cut gears, issue a little circular calling attention to the superiority of bevel gears with plain teeth over those having teeth cut with a rotary cutter.

A circular sent out by the Wisconsin Graphite Company, of Pittsburg, Pa., calls attention to the value of the Wisconsin graphite pipe joint paste as a compound for forming a joint that will successfully resist heat, cold, acids and alkalies.

Jenkins Brothers, of New York, Chicago, Philadelphia, Boston and London, issue a little 16-page pamphlet entitled "Points on Packing." The pamphlet discusses the construction of packing, and describes the Jenkins' gaskets, gasket-tubing, pump-valves, etc.

A little pamphlet of 16 pages, issued by the Norton Emery Wheel Company, of Worcester, Mass., is entitled "A Few Points about Grinding." It discusses in an entertainng way some of the common mistakes made in the use of emery wheels in grinding machines, and corrects some popular errors.

The Joseph Dixon Crucible Company, of Jersey City, N. J., issues an artistic little folder entitled "Colors and Specifications." As the title implies, the folder contains specifications for painting steel and iron work, and it also contains a sample card showing the various shades in which the Dixon graphite is put on the market.

The Wood Drill Works, of Paterson, N. J., issues circulars describing its 2¼-in. drill, designed to meet requirements where a 2-in. drill is too small and a 2½-in. drill is too large. It is made strong in several parts, and the chuck-pushing key and chuck-bolt are the same as the 2½-in. drill; so that no change in steels is necessary, where the 2½ and 2¼-in. drills are used in the same mine.

Coal handling machinery for tower stations, boiler rooms, coaling stations, gas companies, coal yards, etc., is described in catalogue No. 035, published by the C. W. Hunt Company, of West New Brighton, S. I. The pamphlet describes briefly the various coal-handling devices made by the Hunt Company, including conveyers, power trolleys, power-hoists, cable railways, etc., and gives plans of some notable coal-handling plants the company has equipped.

The Edson Manufacturing Company, of Boston, Mass., making prospecting and mining outfits, has sent out some new pamphlets calling attention to its diaphragm pumps. These hand-power pumps, it is said, will raise and force water containing gravel, sand, dirt or tailings without choking. They are made in three sizes, having a capacity of 12 to 6,000 gals. per hour. For contractors' and city use the company makes a diaphragm trench-pump having a capacity of 4,000 to 6,000 gals. per hour.

Catalogue No. 9, published by the Bristol Company, of Waterbury, Conn., describes the Bristol recording gauge for making a continuous record day and night of steam, water, gas, oil or air pressure. These gauges, owing to their simplicity and reliability, have come into wide use. They can be had with a variety of dials for recording, the standard size chart being 8 ins. in diameter, making one revolution in 24 hours. For recording low pressure, as in mine ventilation, the company makes a gauge with charts graduated to ounces per square inch to tenth inches head of water, or as may be desired.

Catalogue No. 10 describes Recording Volt, Ampere and Watt-meters. These instruments, like the company's pressure gauges, are of simple construction, and their reliability has been proved by work under a great variety of service. The Volt-meter is constructed on the electric balance principle without permanent magnets.

The Consolidated Engine Stop Company, of New York City, has just published a booklet of rather unique form and apearance, describing the construction and operation of the Monarch engine-stop and speed limit system. The pamphlet contains illustrations showing all necessary details, and also contains copies of numerous testimonial letters received from users of the Monarch system. This system employs an electro-magnet controlled by a switch. In case of the speed of the shaft increasing above the normal rate, a weight is released closing the main valve. The company will send copies to officers or managers of steam plants, who make a request and their regular business stationary.

A very handsome folio pamphlet of 74 pages, published by the Bates Machine Company, of Joliet, Ill., contains remarkably fine half-tone cuts of the Bates Corliss engines, showing the construction of the frame, piston, valve-gear and valves. The frames are of two types, the standard box girder, and the extra heavy duty the latter particularly suited for engines driving direct-connected generators. The engines are built in 32 sizes, with cylinders from 12 to 36 ins. by 30 to 72 ins., and running at speeds of from 55 to 90 revolutions per minute. The extra heavy engines are built with cylinders 16 to 36 ins. by 36 to 72 ins., to run at 55 to 82 revolutions per minute. These engines have been furnished for street railway and electric lighting plants, for lumber mills, Portland cement works, etc., and the company has furnished three engines with steam-jacketed cylinders for driving Cornish pumps to the Heidelburg Roodeport Gold Mining Company, Johannesburg, S. A. The company also makes air and gas compressors that have mechanically moved inlet valves, and light steel cups working against phosphor bronze, or cast-steel seats for outlet valves. The compressors are used by several natural gas companies.

SPECIAL CORRESPONDENCE

Butte, Mont. July 11.

(From Our Special Correspondent.)

The closing of the mines of the Anaconda Copper Mining Company and those of the Washoe Copper Company, while the connections are being made with the big flue at the Washoe Smelter at Anaconda, has been the means of temporarily laying off some 4,000 miners. It was announced at the time that it would probably take some five weeks to complete the work of making the flue connections. Most of the timbermen employed in those mines are retained renewing timbers, etc. At the Parrot Mine sinking the main shaft is under way, it being understood the shaft will go to the 2,000-ft. level, the present depth being 1,800 ft. The Gagnon shaft, also 1,800 ft. deep, will be sunk to 2,000 ft. The mines belonging to the Boston & Montana and the Butte & Boston companies are not affected by the close of the other Amalgamated properties, as the ore from these is treated elsewhere, that from the former going to Great Falls for treatment, and the ore of the latter company being reduced at Butte.

About the only figures obtainable regarding the operations of the various mining companies operating in the Butte District, are the figures turned in to the office of the county assessor for taxation purposes. These annual reports covering the 12 months from June 1, 1902, to June 1, 1903, are just available. The net proceeds of the various companies are as follows: Anaconda, $1,601,200; Boston & Montana, $4,053,465; Butte & Boston, $202,408; Colusa-Parrot, $245,785; Montana Ore Purchasing Company, $601,250; Colorado Smelting Company, $43,090; Parrot, $586,365; Speculator, $106,785; Washoe, $1,651,767; a total of $7,441,800. This total includes a few lesser operators also. This is nearly $2,000,000 greater than the figures turned in to the assessors' office for a year ago. The transportation charges range from 15c. per ton of crude ore by the Washoe to $1 per ton paid by the Boston & Montana Company; the ore of this

company is all sent to Great Falls, a distance of 175 miles.

An imposing array of legal and expert talent is congregated in Butte at the present time, interested in a mining case now being tried before Judge Clancy of the District Court. The case is entitled J. S. Hickey and others versus the Anaconda Copper Mining Company, and the Washoe Copper Company; it is generally known as the "Nipper Mine Case."

The Nipper Company owns 31-36 of the Nipper claim and the Amalgamated Company owns 5-36. On this point there is no controversy. The principal plaintiffs in the case are F. Augustus Heinze & Bro. It is an apex question involving a claim for extra-lateral rights. The Blue vein, which cut such a figure on the Anaconda-Colusa-Parrot case some three years ago will again be brought forward. J. H. Denny, McHatten and Cotter are the attorneys for plaintiffs. Ex-Governor C. S. Thomas, of Colorado, and C. F. Kelley appear for the other side. Te case will be a hard-fought legal battle. The Amalgamated Company wanted a postponement of the trial, but was overruled by the court on all points presented. The case involves some of the most important mines of the camp.

But little information can be secured from the people at the head of the new Pittsburg & Montana Copper Company. The scenes of their operations are inclosed by a board fence 10 ft. high; intruders are met at the gate by a watchman, and while no double-barreled shotgun is in sight, his manner leads one to think he has one close at hand and ready to use it. The work of construction seems to be progressing at a rapid rate, judging from the appearance of things from the outside. It is also understood that the Pittsburg & Montana people have purchased the Jacquemen property at Elkhorn, in Jefferson County, for the sum of $60,000. This is a big body of iron sulphide ore carrying from 1.5 to 3 per cent in copper.

Denver. July 11.

(*From Our Special Correspondent.*)

The situation at the Grant and Globe smelters, near this city, of the American Smelting and Refining Company, is peaceful, and there are no outward indications that friction will result from the effort to resume operations at the Globe. Both plants are guarded by special police.

On July 6 General Manager Guiterman issued a statement to the public giving the company's position, much as it has already been stated in our columns. He stated that the many points really involved in the strike was whether the smelting business in Colorado should be conducted subject to the interference and dictation of the Western Federation of Miners.

On the same day the Advisory Committee of the Denver Citizens' Alliance adopted resolutions condemning acts of the mob, and pledging the support of the Alliance to the maintenance of law and order, and the rights of employees.

On July 7 Manager Guiterman obtained an injunction from the local District Court against the Denver Mill and Smeltermen's Union, the Western Federation of Miners, the Denver Trades Assembly, the American Labor Union and others, prohibiting them from interfering with the company or its employees, picketing, etc.

Manager Guiterman announced on July 8, through the local press, that the company would resume operations at the Globe Smelter at 7 a.m. on the 9th inst., and that all former employees in good standing and such as did not participate in the riotous proceedings of July 3 and 4 would be again employed at their request.

Previous to the strike unskilled labor was very scarce in this city and State, and many of the smelter employees left the city immediately after the strike, in the belief that operations would not be resumed for some time, the beet growers and farmers generally offering comparatively high wages. The company will make every effort to resume, but does not expect to be in full operation at the Globe Smelter in less than 60 days, while the Grant Smelter needs considerable repairs, which render resumption of operations there quite indefinite.

The folly of the strike is shown by the fact that although the American Smelting and Refining Company is operating smelters at Pueblo, Leadville and Durango in Colorado, and a number of other smelters in Utah, Montana, Nebraska, Texas, New Jersey, New Mexico and Mexico, no strike or difficulty of any other kind has occurred except at its Grant and Globe plants in this city. The company could transfer its work, now done in Denver, to its plants at other points, if forced to adopt that course by the action of its Denver employees.

Emissaries of the Western Federation of Miners are endeavoring to induce the employees of the company at the Pueblo and Leadville smelters to join in the strike.

Mr. W. J. Chamberlain, president of the Chamberlain-Dillingham Ore Company, which controls samplers in Gilpin, Clear Creek, Boulder and Summit counties, as well as a Denver plant, says that his company will continue to buy ore, whether the Denver smelters of the American Smelting and Refining Company remain closed or not. For the present, the ore bought by his company in the vicinity of Idaho Springs is shipped to Pueblo, the only additional charge to the mine owners being 25c. per ton for transfer in Denver from narrow-gauge to standard-gauge cars.

The Colorado City Mill and Smeltermen's Union will hold a special meeting to-night, after which a statement will be issued to the public regarding the strike at the Standard Mill of the United States Reduction and Refining Company. The company also owns three mills at Florence, viz., the Union, National and Metallic. The last two have been closed ever since the strike two years ago. The Union Mill is employing 175 men, some of whom are said to belong to the Mill and Smeltermen's Union. President Burns, of the Portland Mining Company, says that in the event of the closing down of the Standard Mill, the independent plants, such as the Portland, Telluride, Dorcas, Economic and several others now under construction in the Cripple Creek District, will be able to handle the greater portion of the ore mined in Cripple Creek.

The improvements to the zinc smelter of the United States Reduction and Refining Company at Canyon City are expected to be completed in a few days, and the plant practically in full operation before the end of the month. The smelter has been partially paralyzed since the serious fire in March last, from which time the company has been engaged in rebuilding the portions destroyed and enlarging the total capacity. The product of the plant is paint pigment and, in addition, the gold and silver values in the ore.

General Manager T. Goodwin, of the Ohio & Colorado Smelting Company, announces that the company will erect at Leadville a duplicate of the Salida Smelter on the site of the old Republic plant. On July 8 the company put into effect at the Salida Smelter the eight-hour system, on furnaces only, with the following wages: Feeders and furnace men, $2.75; tappers, $2.50; drivers, $2.25; charge feeders, $2.25. The change will result in an increase of 33 per cent in the number of men employed in the furnace department.

San Francisco. July 8.

(*From Our Special Correspondent.*)

The Copper King Mining Company (Limited), with a mine at Clovis, Fresno County, and a smelter on the upper shores of San Francisco Bay, has filed its schedule of debts and property in the United States Court; and this shows an indebtedness of $614,423, of which $508,695 is unsecured. The total assets are given as $306,704. They count the real estate as $99,400, and machinery at $180,225. The mine at Fresno is only valued in the statement at $85,400, covered by attachments. The whole failure is the result of extravagant management. The breaking up of the company involves San Francisco and London financiers and banks. A number of San Francisco machinery firms are also sufferers. The deal for the sale of the mine and its equipment was managed by W. H. Daily and Frank L. Gardner; and Gardner figures as a creditor for $207,742, cash advanced. Daily was the local manager. Finally the mine was attached by miners and other creditors, and work was stopped. Then the attorney of the San Francisco Board of Trade petitioned the United States Circuit Court to declare the company insolvent. A large amount of money was sunk in exploiting the mine and conducting the smelter.

The miners at Stent and Quartz in Tuolumne County are on strike. This is really the spread of the Amador County strike of a few months past. They now demand an increase of from 25 to 50c. per day as per following schedule submitted to the mine managers: Machine miners, chuck tenders, hammermen, timbermen and pumpmen, $3 per day; and all other skilled laborers not less than $3; muckers, carmen and top laborers, $2.50 per day; millmen, engineers and machinists, $3.50. In the case of the machine miners and timbermen the scale is the same as before.

The mine managers have asked for a guarantee from the union that there will be no more trouble for six months. The matter is still in an unsettled state.

On July 2 there was a bad fire in the mining town of Angels, in Calaveras County, and a number of houses in the residence section were burned. No damage was done to mining property.

A great deal of activity is showing itself around the town of San Andreas, in Calaveras County. This is one of the old mining camps of California, but it has been dull for some years, until lately. It is on the Mother Lode in the center of the county, and is surrounded by many good mines, many of which are showing greatly improved prospects.

The recent developments at the Vinich Company's mine at Bear Mountain, 3 miles from Angels, Calaveras County, are thought by some to indicate the discovery of the extension of the Gwin Mine vein southwards. The true course of the Gwin has never been traced beyond Golden Gate mountain at the head of Bear Mountain range, and it will be of great importance if the ledge in this mine, with a width of 27 ft. is proved to be the Mother Lode.

The announcement is made that a million-dollar smelting plant will be put on the Balaklala copper mine in Shasta County. While it is not probable that the amount named will be spent, yet the fact that another large smelter is to go up in Shasta will be a matter of satisfaction to the miners of that county. There are already two large ones there—those of the Mountain Copper Company and the Bully Hill Copper Company. As these smelters need quartz for flux the owners of quartz properties find a ready market for their ores without the necessity of putting up reduction works. A transmission line for electric power to the Balaklala mines is being built, and many new buildings are being put up. The Mountain Copper Company at one time held an option on this property, but it lapsed.

Some of the Northern counties are much disturbed over the plan to create a large permanent forest reserve, especially Shasta, Trinity and Siskiyou counties. It is stated that if the present temporary reserves are made permanent, Shasta County will lose 2,556 square miles, or 1,600,000 acres of land, or 65 per cent of its taxable value; Trinity, 1,600 square miles, or 60 per cent of its taxable value ,and Siskiyou, 3,500 square miles, or 50 per cent of its area. Vast tracts of this land contain no forests at all, and where there is timber it has been already taken up. A great deal has been denuded of its timber. Lots of this will be exchanged for scrip to be placed on some virgin forest land elsewhere. The miners are all opposed to the timber reservations.

Shasta County is far outstripping in yield from mines that of any other county in the State. While Nevada County leads in gold Shasta has copper, silver and gold, and its copper values bring the total yield several millions beyond any other county of California. In 1901 the yield was $7,737,571, but for 1902 the figures are smaller, owing to lower prices for copper, and reduced yield of the mines caused by miners' strikes. For 1903, however, the local papers claim an average yield of about $800,000 per month thus far. This is beyond the exact facts, but still the county is making rapid strides in the development of its copper resources. Not all the copper claims are producing, since thus far there are only two smelters working.

It is understood that at the new furnace of the California Iron and Steel Company, at Newport, Orange County, an attempt will be made to manufacture pig iron from Lower California ore by crude oil fuel. A 50-ton furnace, operated for three weeks, is said to assure the projectors of the success of the enterprise. The projected smelter is to have a capacity of 500 tons per day, using oil at 50c. per bbl. This experiment will be watched with interest.

The center of the dredging industry in this State is at Oroville, Butte County, where 22 dredges are now at work, and more are being built. The dredges cost from $60,000 to $80,000 each. Most of the ground there has been for years covered with orchards or vineyards, but the ground is worth more for mining. The first dredge at Oroville was built early in 1898, since then the capacity of the machines has been greatly increased and the cost of operating sensibly decreased. The present machines handle twice as much dirt as the old ones at about two-thirds the cost per yard. The payable district proven by drilling around Oroville comprises about 6,000 acres, of which about 500 have been worked, while much more land is yet to be tested. All the dredges around Oroville are operated by electricity generated by water power. The best ground is from 15 to 50 ft. deep, free from boulders and without hard, rough bedrock. The average value of the ground is about 17 or 18c. per yd. One company obtained an average of 15c. per cu. yd.; another last year obtained 13.42c.; another 15c.; another 17c.; another 15c.; another 22c., and still another only 10c. These records show about average yield per cu. yd., where many hundred thousand yards are handled. Near Fair Oaks, Sacramento County, Callahans, Siskiyou County, Redding, Shasta County, and along the Yuba River in Yuba County, other dredgers are operated. Along the Yuba, near Marysville, a great deal of dredging ground is being taken up and prospected, mainly by Oroville men. On one tract comprising 3,000 acres, several drills are at work.

On June 15 last over a million acres of land were thrown open to settlement along the line of the Santa Fe Pacific road, between Needles and Mohave, being sections 3, 7, 11, 15, 19, 23, 27, 31 and 35 in each township. The numbered sections have been open heretofore, but no settlers have taken up any land, as it is a desert country.

It is expected that large traction engines will shortly displace the picturesque 24-mule teams for hauling borax from the borax mines of the Pacific Coast Borax Company in San Bernardino County. A new ledge of Colemanite on the eastern side of Death Valley is to be opened. The ore will have to be hauled about 100 miles to Ivanpah, where there is a spur from the Santa Fe main line. It is expected that the traction engines will make better time and take heavier loads than the mule teams. The mines already being worked are very productive and profit-

able, and the company owns a vast amount of ground yet untouched. The summer temperature in that desert region is excessive, sometimes going above 120° in shade.

The California mining public is pleased to know that J. S. Diller, of the United States Geological Survey has started work in the Redding section, Shasta County, and that George H. Eldridge will complete his investigations in the southern petroleum fields.

What they would all like to see, however, more than anything else is a careful investigation of the Mother Lode region and the issuance of a monograph on that subject of the same scope and character as that of Dr. Becker on the Quicksilver deposits. There has been more or less "pottering" along the Mother Lode, but nothing as complete as the section warrants. There are many mines on the lode now down over 2,000 ft., and with miles of drifts, etc., so that there is every chance for thorough investigation.

It is announced from Bakersfield that the Standard Oil Company has decided to double the number of its pumping stations along the $3,000,000 pipe line built to bring oil from the Kern River fields to Point Richmond on San Francisco Bay. The original pumping stations were 28 miles apart, and are now to be every 14 miles. The first of the additional ones is at Kimberlin, 10 miles from Bakersfield. The crude oil in the pipe line has come no farther than Newman, about 120 miles from Point Richmond. Even with summer temperatures it is coming very slowly, and for this reason more pumping stations have been decided on.

The Bureau of Forestry has commenced the work of examining the forest lands of California in detail in order to determine what parts are suitable for permanent forest reserves. A number of very interesting features are to be studied by experts and reports printed.

Several steamers have arrived from Nome, bringing gold from the Klondike, Nome, Yukon points, etc. A little over a million dollars has so far come down, but the following steamers will doubtless bring larger amounts.

J. J. Rutledge is to have a gold dredger on Forty-Mile River, and if it proves successful he will place others there, and in other parts of Alaska. The bars have yielded well, but there is much ground which can be handled by dredgers which can scarcely be worked by other methods. The first dredge for Forty-Mile has been ordered in San Francisco.

The Brown-Alaska Company, at Ketchikan, Alaska, is to put up a smelter, and the contract for the buildings is reported let. All the machinery has been purchased.

It is reported that the smelter at Everett, Wash., will soon pass into control of independent miners of Eastern Washington, Idaho and Montana. The smelter was built 12 years ago, and is at present owned by Rockefeller.

Victoria, B. C. July 7.

(*From Our Special Correspondent.*)

At last the long-drawn-out trouble between Mr. Dunsmuir and his employees at the Ladysmith collieries has been adjusted, and by a vote of 108 to 117 the men this week returned to work. A settlement was all but arranged two weeks since, negotiations being, however, broken off at the last moment on very inadequate grounds. Four months have elapsed since the mines were closed, the loss to the country, to the mine owners and to the miners themselves amounting to a very respectable sum. The resumption of operations means the signal defeat of the Western Federation of Miners, and in consequence it is not unlikely that the influence of this organization in Western Canada will be largely destroyed. In the present instance it is certain the Federation failed to afford the Ladysmith workers the pecuniary assistance they had been led to expect, while only the other day, the East Kootenay coal miners severed their connection with the Federation on very similar grounds.

The exploitation of the Kootenay coal areas is now being prosecuted vigorously, and with the efforts now being put forward at Fernie all cause for complaint on the score of the inadequacy of the fuel supply must shortly be removed. There are now in all 15 furnaces in operation on British Columbia ores, nine in the Kootenay, and six at Northport, But this number should be considerably augmented in the near future, as Trail still has its two lead stacks idle, the Boundary Falls smelter is not working to the full capacity of the works, and according to a statement recently made by Mr. Miner, president of the Granby Company, six furnaces, will be placed in commission at Grand Forks, directly the arrangements for a continuous coke supply from the mines at Blairmore, in which the company is interested, are completed. The Granby mines producing at the rate of 1,000 tons a day, a large additional supply of fuel having been obtained from Fairfax, Washington, thus enabling another furnace to be blown in. Other mines, notably the Snowshoe, in this camp, are increasing their outputs, and it is said, arrangements are being made to ship the ores on the dumps at the Brooklyn and Stemwinder.

At Rossland also the outlook is decidedly encouraging. Recently three mines have joined the shipping list, and others are preparing to do so shortly. By October of this year a beginning will be made in the direction of treating the lower-grade ores of the camp by concentration methods, a departure which may be regarded as opening the widest possibilities for the future. Already shipments for the half-year show a proportionate increase over the returns for the corresponding period of 1902, but since the blowing in of the additional furnaces at Northport, the recent rate at which production has been maintained is certain to be improved upon.

On the Coast the immediate prospects ahead are no less promising. The result of the meeting of the Lenora creditors last week assures an early resumption of operations at this mine; the Tyee continues to improve on past records, and the Texada mines, as a result of systematic developments, are promising well. Last but not least an early exploitation of the considerable resources of the Howe Sound Section is assured. It is stated that arrangements have been made to commence shipments from the Britannia to the Crofton Smelter, while an English syndicate has bonded properties in South Valley, and has sent out experts to investigate other claims in this neighborhood.

It is impossible to hear of the frequent new discoveries and the satisfactory results attending operations in and about Cambore without hope. Two more stamp mills are now in course of erection in this locality. Meanwhile, a great deal of excitement and interest has been occasioned by the discovery of exceptionally rich free-milling gold quartz, on Poplar Creek, in the Duncan Lardo District, situated some 40 miles from Kaslo, and as a consequence a regular rush to locate claims in this promising locality is in progress. It should be stated that the district is not, strictly speaking, new. As early as 1892 this section, between Kootenay and Trout lakes, attracted notice and many claims were staked out, but the inaccessibility of the region and the fact that other districts then promised a quicker reward for prospecting endeavor, militated against any determined attempt at exploitation at that time. Again some five years later the district came in for some further attention, but this rapidly gave way before the early Klondike excitement. In 1899, a number of prospectors visited the locality upon the commencement of construction work on the Lardo-Arrowhead Railway, but not until last year, when this line was completed, were development operations carried on to any great extent. The present excitement was caused by the discovery by two prospectors of some phenomenally rich quartz on the Gold Park claims, specimens of which they brought to Kaslo; and since then very high assays have been obtained from other claims in the vicinity. The country here is very heavily timbered and rugged, hence prospecting is by no means easy.

Coal explorations in other districts outside those of East Kootenay continue to be carried on. During the past week boring operations have been resumed near the Similkameen River, at Princeton, by the Vermilion Forks Mining Company, and the property of the Diamond Vale Coal and Iron Mines, Limited, on Hamilton Creek, near Quilchena, is being also exploited. On the coal lands on the North Fork of Kettle River, a 5-ft. seam is being opened up, and preliminary prospecting work undertaken.

Hydraulic mining on Perry Creek, East Kootenay, continues to attract much attention. The East Kootenay Placer Mining Company is now engaged in sinking a shaft to bedrock. The recent clean-up from 1,000 yards of gravel, which was moved by the steam shovel, showed satisfactory results in gold, and in consequence it has been decided to purchase additional machinery, which it is expected will enable 1,000 yards a day to be moved. The steam power is now being used for hoisting purposes in sinking shaft to the bedrock. It will be also used later on in digging a large ditch to carry the water from several miles up the creek to the sluice box on the bedrock. A shaft was sunk on this property in 1897, but a dike was struck before drifting had been carried far, and the work was abandoned.

A very promising new section is that of Aspen Grove in the Nicola. The ore here is chiefly copper, the surface exposures being in some cases exceptionally large, having too fair grade values. The Portland is at present, the best known property, and it is said that the mineralized deposit has when stripped proved to be 205 ft. in width. It is proposed meanwhile to set up a matting plant on the claim. A number of locations have recently been made in the vicinity by prospectors, assay returns of the ore from which show good results in copper. The Nettie L. and Silver Cup mines, in the Trout Lake Districts, have shipped 6,950 tons of silver-lead concentrates, valued at $981,875, or $140 per ton.

San Luis Potosi, Mex. July 1.

(*From Our Special Correspondent.*)

In Coahuila a large part of the holdings of the Mexican Mining Syndicate, of Mazapil, has been taken over by the Guggenheim Exploration Company, and at El Fuente the land of Indalecio Vara has been leased to El Fuente Coal Company, whose lands adjoin, and where has been found a 4-ft. vein of excellent coal.

From Durango it is understood the litigation on La Trinidad Mine, having 100 pertinencias, about 150 miles from the City of Durango, which has been on for over a year, has finally been settled, and work will soon be resumed. The Mexican Mining and Exploration Company is preparing to build a line from that of the Mexican Central at Parral, a distance of about 60 miles, to its mines in Durango, with J. V. Dignowity, of San Antonio, Texas, as general manager, and G. S. McGregor, of San Francisco, in charge of the mines.

In Guanajuato at San Anton de las Minas, the Dolores Mining and Milling Company is down 100 meters with the new shaft, and has struck what is believed to be the Promontoria vein; reported assays are showing 80 oz. in silver and 1 oz. in gold.

At the smelting plant of the Compania Metalurgica Mexicana, in San Luis Potosi, the new superintendent, Carl Koelle, is figuring on four new blast-furnaces to replace four of the older ones. At Matehuala a deal is pending on the Nueva Pertinencias, of Inocencio Narezo, which has been reported upon favorably, and is under option to D. M. Sprague, who will put in a new mill and increase development.

At the Santa Francisca Mine, in Asientos, Aguas Calientes, the Guggenheim Exploration Company, has a large vein of high-grade silver ore, of which about 150 tons a day is being shipped. And from the Fortuna Mine, of Tepezala, controlled by Messrs. Creveling and Wardman, of Aguas Calientes, shipments are steadily increasing. At the Aguas Calientes plant of the American Smelting and Refining Company, which has already a capacity of 1,500 tons a day, with five lead and three copper furnaces, the company is taking advantage of the "fuerza mayor" clause in its contracts, claiming that the lack of men for unloading cars, etc., is a thing beyond its control, and is curtailing shipments as much as possible, while a number of improvements and additions are being made to the plant.

In Oaxaca La Compania Petrolifera del Pacifico, a new company with a capital of $1,500,000, Mexican, organized for boring for oil on the west coast, and headed by Enrique C. Creel and his associates, has obtained a concession on 12,000 hectares, near Puerto Angel, and has ordered an immense drilling outfit from the States. They will begin prospecting as soon as it arrives. At the San Martin mines, in Taviche, the development has been such that it has been necessary to add 20 stamps to the mill, and now a deal is on for the sale of the property.

Sydney, N. S. W. June 9.

(*From Our Special Correspondent.*)

New South Wales.—The report of the Royal Commission appointed to inquire into the Mt. Kembla colliery disaster has been sent in. The conclusion come to is that the accident was due to a cave-in of a 35-acre waste, which drove an inflammable mixture of firedamp and air into the workings, which became ignited by a wheeler's light, also that the explosion was aggravated by the presence of coal dust. The carbon monoxide of the afterdamp caused the death of a greater number of the victims than the actual explosion.

Mining matters at Copeland have lately received an impetus, owing to the discovery of several new reefs carrying gold at Upper Bowman.

A reef, the presence of which has long been suspected, owing to rich quartz specimens having been found in the alluvial, has lately been found among the old workings of Day's Hill, Blind Creek, near Harden, where a highly promising body of quartz, about 2 ft. thick, has been struck. A ton treated is reported to have yielded over 3 oz. gold to the ton.

A new alluvial find has been made 1.5 miles from Gundagai. At a depth of 30 ft. they struck 3 ft. of wash, and the first dish contained a nugget weighing 2 oz. 3.5 dwt., and several grains of fine gold. If this lead proves to be a continuation of the old Spring Flat lead, worked in 1864, good yields may result, as this was one of the best leads in the State, many large nuggets being found on the false bottom, some weighing over 60 oz. Mr. Thomas McAllister, still a resident of Gundagai, picked out £700 worth of nuggets from his claim in one day.

The old Faulkners Mine at Pambula is looking up again. Splendid gold is being worked from the footwall, which was formerly taken to be country. One hundred men are employed: All the rich ore is being shipped to the smelters, while the low-grade gold ore will be treated by local batteries.

The board of directors of the Broken Hill Proprietary Company are so satisfied with the results of G. D. Delprat's salt-cake process for the treatment of their zinc tailings, that they have authorized the erection of a plant capable of treating 1,000 tons weekly. The cost of the plant is estimated at £4,000, and the present trial plant, which treats about 150 tons per week, will form one unit. It is anticipated that the plant will be ready for working within three or four weeks. The diamond drill that has been boring

eastward from the 800-ft. level, has passed through 35 ft. of ordinary grade ore without meeting the footwall. This is probably the eastern leg, corresponding with that exposed at the 650-ft. level. The miners of the Broken Hill Proprietary Mine are trying through the arbitration court to get a raise of 1s. per day, 10s., instead of 9s., as at present, and to reduce the working hours for all underground employees from 48 to 46 hours per week. This, together with other modifications of the working conditions, the men are trying to get, represents a money value of £60,000 per annum to the company. If the men get their way it simply means that the bulk of the savings due to general economies or improved methods of treatment will go to the employees instead of to the shareholders.

What appears to be a continuation of the rich lode formerly worked in the main workings of the Australian Broken Hill Consols has been picked up some 800 ft. away, and is at present being prospected, some of the manganese iron-stained capping has yielded very good results for silver.

The shareholders of the Great Cobar Copper Company have agreed to accept the offer from the Great Cobar Syndicate for the purchase of their property in case the negotiations for the sale of the property in England falls through. This will finally settle the dispute between the company and the tributors.

The gold yield from ores won in this State for the month of April is 31,200 oz. fine, valued at £132,530, and for the first four months of this year 63,948 oz. fine, valued at £271,636.

Tasmania.—Negotiations that were recently broken off between the Mt. Lyell Mining and Railway Company and the North Mt. Lyell Company have been renewed, and a provisional agreement, with a view to amalgamation, has been signed by representatives of both companies. A total quantity of 22,021 tons of ore have been treated by the Mt. Lyell Company's smelters from April 2 to 29, inclusive, the average assay before treatment being, copper 2.20 per cent, silver 2.25 oz., and gold 0.72 oz. In addition to the above during the same period, 3,520 tons of metal-bearing fluxes were treated. The total consumption of coke at No. 2 plant has been reduced to 0.25 per cent of the metal-bearing material of the furnace mixture. The capacity of the furnaces has also been increased during the past half year, so that 3 to 4 blast-furnaces are doing the work formerly done by 5 to 8. In this way the working expenses have been reduced by about £28,000 for the past half year. It is considered that the company can now treat its 1.5 per cent ore with copper at £55 per ton, and still make a small profit.

The directors of the Western Mine have decided to accept a London offer for the purchase of their mine. The capital of the new company is to be £60,000.

Osmiridium has lately been discovered in the creeks of the serpentine country between Huskinson and Wilson rivers in the neighborhood of Zeehan. During the past four months the prospectors have won 40 oz., varying in size from fine grains to a speck 4 dwt. 15 gr.

The board of directors of the Tasmanian Gold Mine, Beaconsfield, have accepted an offer subject to ratification by the shareholders, for their mine. A new company is to be formed with a capital of £500,000 in £1 shares, of which £160,000 will go to working capital, including £10,000 for the present company's liabilities.

Queensland.—The gold yield for April was 67,562 oz., as compared with 67,193 oz., for the corresponding month of last year. The chief producers were:

	Gold, oz.	Paid in dividends.	Calls made.
Charters Towers	30,556	£45,442	£18,183
Gympie	14,005	19,100	7,799
Mt. Morgan	10,777	12,500	nil.
Ravenswood	4,764	nil.	1,225
Croydon	3,080	nil.	863

There are signs that the Gympie gold yield for May will be the best record for any month in the history of the field. The South Glanmire & Monkland has cut a 2½-ft. reef formation carrying good gold in the western crosscut from the rise near the No. 2 South Great Eastern boundary. This stone is presumably the No. 2 reef of the No. 2 South Great Eastern. The Oriental & Glanmire has also struck a new find of payable gold lately. Croydon also shows signs of a revival, a larger number of mines being on gold than for a long time past. A splendid development has taken place in the Golden Gate Consols, the reef in the bottom of the north level averaging 15 ins. thick, and prospecting fully 10 oz. gold per ton. This shoot is now proved for 30 ft., and is still going on.

Johannesburg, Transvaal. June 15,

(*From Our Special Correspondent.*)

Were one to judge by the market he would be forced to take a discouraging view of the mining industry of Johannesburg. Very seldom during the last six years have stocks been as low as they are today. Even in the big collapse on the outbreak of hostilities, the market did not seem as pessimistic as it is now. When war was declared, the opinion of the Stock Exchange was that it would be over in a few months' time. At the end of the war conditions would be much improved, so it was said, and this belief tended to keep prices up. But the difficulty the mining industry is laboring under at the present time is one that cannot be suddenly remedied. After all the exertions of the past months, the number of Kaffirs now working on the mines is about 2,000, whereas before the war there were over 100,000 employed. The public has heard for months of the "big supply of native labor about to be tapped in Central Africa," etc., but when they compare the number of Kaffirs that came to work with the number that go home, they find only a small increase. An increase of 3,222 Kaffirs only was recorded during the month of May.

The number of blacks now at work is less than half what the industry requires. Scarcely a gold mine in the country is in full swing. In fact, some of the big mills are unable to keep half of the stamps at work. Already one or two mines in the development stage, have stopped all work on account of the unsatisfactory condition of the labor market, and the worst of it is that there are few signs of improvement in the supply of cheap laborers, so far as South Africa is concerned.

Investors in Europe have probably taken note of this shortage of labor. They have also noticed that the present working costs are higher than before the war. Some simple calculations have been made, and it is found that, considering all the drawbacks, the gold mines of Johannesburg are dear at the present prices. In consequence, prices have fallen, and in some of the speculative stocks the prices are just half what they were a few months ago. Even at the reduced prices, a simple calculation shows that some of the popular "sound" stocks are high at the ruling prices. Take, for instance, a deep level on the Central Rand, with a capital of £350,000, whose shares are quoted at £6. In the present state of affairs this mine will not commence crushing for 1½ years. When they begin to make profits interest must be paid on £2,100,000. From a gold mine 9 per cent should be expected, at least, and to pay 9 per cent this mine must make £189,000 profit per year. Judging from the present outlook, it will be a long time before the mine can earn this profit. Until the producing stage is reached, the investor gets no return on his money. Therefore, although the mine is eminently safe, and will some day be a good dividend payer, the present price of the shares is too high.

Then there is a class of mines which is expensive at any price. Even with the best industrial conditions such mines can only pay expenses. What wonder is it then that at such a time as this the shares fall to such low prices.

The Rand is, to a great extent, the barometer of South Africa. When things are booming in Johannesburg the whole country looks up. In days of depression of the gold industry South Africa seems to take on a sombre hue. The complaint one hears in almost every center just now is that things are dull. In Mafeking, Bloomfontein, etc., people tell you that trade is very slack. The farmers in the Transvaal and Free State say that it is impossible to do much in building up their homesteads, and in sowing or reaping crops, on account of the scarcity of labor.

The only place in South Africa that strikes the visitor as being in full swing is Kimberley. They do not seem handicapped for black labor. Kimberley, by the way, is the favorite labor market of the South African blacks, for they can earn a higher wage there than in other parts of the country. While other industries languish for labor, Kimberley seems to be well off. They are lucky, too, in getting by far the better class of Kaffir labor. Fortunately for Kimberley, the diamond mines have an enviable reputation among the best tribes of blacks in South Africa, so that the Kaffirs voluntarily come to work, and are not sought out by labor agents, as are the Kaffirs that are sent to the gold mines.

The view taken by some is perhaps too gloomy. Things must right themselves. The all-important thing is here, at any rate, gold in payable quantities. What some people in this country fear, is the possibility of this depression drifting into a panic, thereby frightening capital away from South Africa. Western Australia is an instance of a country crippled for a long time by this withdrawal of capital. Should capital become sceptical of South Africa, then the country is doomed for years to an industrial depression.

GENERAL MINING NEWS.

Mineral Oil Exports.—In June and the fiscal year ending June 30 the exports of mineral oils from the United States were as follows, in gallons:

	June.	Year.
Crude	8,456,362	132,304,908
Naphthas	1,143,582	11,368,660
Illuminating	54,842,037	683,868,414
Lubricating and paraffin	7,478,344	91,096,972
Residuum	91,770	22,389,382
Total	72,012,095	941,028,336

Compared with the previous fiscal year there is a decrease of 149,340,564 gals., or 13.7 per cent, chiefly in illuminating oil. The principal buyers were Great Britain, Germany and Holland, France, Belgium and Japan.

ALABAMA.

BIBB COUNTY.

(*From Our Special Correspondent.*)

Southern Cahaba Mining Company.—The property of this company, T. H. Aldrich and P. B. Thomas, owners and managers, has been sold to Daniel Pierson, Jr., of New Jersey, and associates. The properties are located at Hargrove, and consist of about 3,000 acres of coal lands, partly belonging to the State University, and under long lease, and partly owned. Two mines are on the property, and as soon as the strike is over 1,000 tons of coal can be mined daily. The new company has elected the following officers: Daniel Pierson, Jr., president and treasurer; Harold R. Sanson, vice-president and manager; W. T. Archer, secretary. The coal mined by this company is among the best in the State. There will be no change in name. Messrs. Pierson, Sanson and Archer are the owners and managers of the cement works at North Birmingham, manufacturing cement out of furnace slag.

CALIFORNIA.

ALAMEDA COUNTY.

A. James has located in Murray township a claim known as the Cowboy manganese mine.

BUTTE COUNTY.

In the mountains back of Oroville, in the eastern part of the county, many pocket miners are at work, encouraged by the recent successes in this kind of mining.

Gold Bank.—This old gold mine, at Forbestown, owned by the W. W. Stow estate, after many years of productiveness, has been shut down. The ore taken out lately has been of too low grade to be profitable.

Douglas Flat.—Two powerful Cornish pumps have been placed at this gravel mine by Superintendent Job Evans, and are expected to handle all the water easily.

Dumbarton Castle.—This mine, near Railroad Flat, has been bonded from James McKay, by L. M. Rucker, of San Jose, Santa Clara County, who will begin operations on a large scale. A 50-ft. tunnel is to be run to tap the vein.

CALAVERAS COUNTY.

Esperanza.—This mine, at Mokelumne Hill, has been unwatered, and they are now cleaning out and retimbering the levels.

Lightner Mining Company.—This company, at Angels, Alex. Chalmers superintendent, has paid its 28th dividend of $10,000.

Mountain King.—Work has been commenced on this mine at Hodson, adjoining the Royal. The mine recently changed owners and ten men are at work. A new boiler has been installed.

Nelson.—Mr. B. C. Nelson, owner of this hydraulic mine at Calaveritas, has saved all his black sands and is shipping them to the Selby smelter for treatment.

Payne Lane Company.—This company, at Esmeralda, owning the old Gum Boot Mine, intend putting in an extensive plant.

Pioneer Chief.—This old mine, formerly known as the Thorn, at San Andreas, is to be worked again by Eastern men, who have taken a bond on the property.

Rosella Milling Company.—This company will erect a mill on their mine at Gardeners Ranch, near Milton.

Rose Rock.—It is understood that the new mill is handling the ores of this mine at Murphys all right. Difficulty has been experienced previously.

Stockton Hill.—At this mine, at Mokelumne Hill, a road is being built, and excavations are being made for a hoist. The old works will soon be put in working shape.

Voinich Mining Company.—This company owns 100 acres of patented ground at Bear Mountain 3 miles from Angels. A 27-ft. ledge has been found at a depth of 85 ft. Martin Voinich, of Angels, is superintendent.

HUMBOLDT COUNTY.

Oscar E. Hershey has bonded the six claims at Orleans owned by Downey, Bowersox & Little, and also the Pioneer Mine, owned by Feheley, Lubbs & Hale. A force has been set at development work.

Gold Bluff Mining and Lumber Company.—Mr. J. D. Hutchinson, late superintendent of this mine, has gone to San Francisco, and John G. Chapman is now in charge of the property at Gold Blug. A suit has been filed by 19 persons against the company; they contend that much of the land held by it is not open to entry as mineral land, but subject to timber entry only.

INYO COUNTY.

W. H. Russell has bonded a number of claims at Fish Spring, including the Commetti Mine, with the intention of consolidating them into one company.

The locations recently made a few miles from Haiwee and between that place and Coso Hot Springs seem to be of some importance. The claims are southwest of Bishop. The ore is said to run about $25 per ton. There is no water near-by.

Arondo Mining Company.—While sinking the shaft at this property, near Ballarat, they found a 2-ft. ledge of higher grade ore than that which they have lately been working. It is expected that new machinery will be put on the mine, which is mainly owned by G. L. Dean and J. P. Jones, Bullard Block, Los Angeles.

Cecil R.—On this property, at Argus, the wood supply was recently burned, and they are about to install a 50-h.p. gasoline engine to run the mill. Ten stamps may be added to the eight now in the mill.

KERN COUNTY.

The gravel claims at St. Elmo are attracting some of the striking miners from Randsburg. Dry washing machines have to be used.

Lucky Four.—Men have gone to open up this new prospect, on upper Kern River. A tunnel is to be driven. It is owned by Drs. Sylvester and Schaffer J. Elwood, and J. Bennett, all of Bakersfield.

Morton Mining Company.—This mine, at Randsburg, Charles Adams superintendent, has closed down on accounnt of the miners' strike. The Mattie and the Yellow Aster remain idle.

Tekla Mining Company.—The property is on Indian Creek, near Caliente, in which Los Angeles men are about to become interested.

MARIPOSA COUNTY.

Anderson.—At this gold mine, near Bagby, on the Coulterville road, a 10-stamp mill is to be erected. The boiler and machinery are on the way to the mine, which is owned by C. W. Anderson.

Hayseed.—This mine, at Whitlock, owned by William Dolph, has resumed operations.

Spread Eagle.—J. Teats, the owner of this claim, has bought a two-stamp mill from S. J. Johns, and will mill his own ore in the future.

MONO COUNTY.

Crystal Lake Mining Company.—This company's mine, at Lundy, the old May Lundy. R. T. Pierce superintendent, has not closed down as reported, but is working about 50 men. The company's headquarters are at Waterville, Me. Davis & Soule are managers.

PLACER COUNTY.

Hibbe Gold and Copper Company.—The difficulties have been settled and work is to be commenced.

SHASTA COUNTY.

Great Western Mining Company.—W. C. Scott, manager of this company, states that excavations are being made for the new smelter for the Afterthought Mine. Mine and smelter are to be connected by a tramway.

SISKIYOU COUNTY.

Helena Gold Mining Company.—This company's property, at Callahans, also known as the McKeen Mine, James McKeen superintendent, has been shut down for a time, and the superintendent has gone to Easton, Pa., to confer with the president of the company, A. D. Chidsey, in reference to using water power instead of steam for the compressors, etc. The mine will be idle for three or four months, letting about 75 men out of work. The company has been cyaniding the ore without milling it previously.

Highland.—This property, formerly known as the Musick, on China Gulch, Salmon Mountain District, is yielding some rich quartz specimens. The owners, Tetherow, O'Neill, Butler & Taylor, have a one-stamp mill.

Nugget.—John Thomas, a pocket hunter, found a $300 nugget in Coyote Gulch, Indian Creek, recently.

TRINITY COUNTY.

Lappin.—This mine, at Deadwood, operated by the James J. Chambers Mining Company, cleaned up about $9,000 from a 13-day run of the mill. Fifteen men are employed.

Quimby Creek.—Beale & Temple, the owners of this mine, at New River, will wait for the expiration of the bond of the company, which recently quit work, and then erect a 10-stamp mill and work the mine themselves.

Union Consolidated Gold Mines Company.—On the Dorleska Mine, at Dorleska, a cross-cut at 300 ft. has encountered the ore-body found above. The ledge is said to be 16 ft. in width. Fifty men are working at the mine, and two mills are kept busy crushing ore. M. H. McIlwaine is superintendent.

TUOLUMNE COUNTY.

Rawhide Mining Company.—Judge Morrow, of the United States Circuit Court, has dismissed the attachment in the case of the Rawhide Mining Company against the Tuolumne County Water Company and the Tuolumne County Water and Electric Power Company. The Rawhide owner, Capt. W. A. Nevills, brought action to recover possession of the power plant of the Water Company, because they failed to pay 40 per cent of the net proceeds to the Mining Company, after the App and Rawhide mines had been supplied with power. This 40 per cent agreement was contracted to be paid the Mining Company on account of purchase price. Capt. Nevills alleged that the receipts of the Power Company was $50,000, and the expenses but $5,000. The defendants showed, however, that the cost of running the plant exceeded the revenue by $19,449. There are two similar suits pending between these litigants and the attachments on these cover all the property of the defendant corporations.

Star Mining Company.—At this company's mine, near Columbia, E. J. Olsen superintendent, the machinery has been placed and an old shaft, which was started in the 60's, is to be unwatered and prospected. The main shaft is down 400 ft. Ten stamps are kept busy.

COLORADO.

CLEAR CREEK COUNTY.

(*From Our Special Correspondent.*)

Cumberland.—This property, situated at the head of Cumberland Gulch, is making a good showing. At present the operators are working on a streak of 8 ins. of smelting ore and 3 ft. of milling. Development is being quite extensively carried on.

Gold Medal.—S. B. Swink, of Dallas, Texas, recently purchased this property through Shaffer & Bonney, of Idaho Springs. The property is well equipped with a good hoisting plant, boarding house for the workmen, and office buildings. Mr. Swink has commenced getting the property in shape for extensive development.

Lucania Tunnel.—The gasoline plant recently installed proved inadequate for carrying on operations. A 100-h.p. boiler and Rand compressor are being installed in place of the gasoline plant which will be in operation within the next ten days, when the tunnel will be rapidly pushed ahead.

New Era.—The cross-cut being run from the New Era vein cut the Great Western vein during the past few days. About 3 ft. of smelting ore was encountered in the Great Western at a point 200 ft. below where the ore has been proven for over 500 ft. in a tunnel in the upper workings. The output is being treated at the mill owned by the New Era Company.

Sun & Moon.—This property recently resumed operations after being idle for four months on account of a strike, inaugurated by the Miners' Union. A double shift is being worked, 55 men being employed.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

The closing of the smelters at Denver is felt here, and several properties have curtailed shipments. Both iron and sulphides show a falling off, which will only be temporary. The zinc production has been light the past ten days, but will be increased heavily within a week. The tonnage the past week averaged 2,250 tons daily.

American Smelting and Refining Company.—The company's plant, the Arkansas Valley, at this point, is running full blast, and an enormous daily tonnage is being handled. The company handled 60,000 tons of Leadville ores during the month of June. The company does not anticipate any trouble with its employees at this point.

Bon Air.—A rich streak of ore, lead chlorides averaging 100 oz. silver, is being followed, and some ore taken out. The company has opened two distinct ore shoots.

Breece Cyanide Mill.—This mill has closed down temporarily to permit the installation of new machinery.

Continental Chief Mining Company.—A new tunnel is being driven to get under the ore-bodies. It is located 80 ft. below the old tunnel, and is in 125 ft., and cross-cutting. Occasional shipments of siliceous ores are being made, and some of the ground is to be sub-leased.

Coronado.—Fire damaged the surface plant to the extent of $4,000 on July 10, but the blaze was extinguished without causing a shut-down of the massive pumps, which would have entailed a loss of thousands of dollars and the drowning of the workings.

Home Extension Mining Company.—The dissolution of the injunction tying up the affairs of this company and the appointment of a referee this week means that President Dunbar will make an effort to start this downtown territory; he has gone East for the purpose of securing funds to continue the work inaugurated several years ago.

Ibex Mining Company.—While shipping 250 tons daily development work is also being pushed, and No. 4 shaft is being sent down to connect with the Yak Tunnel. This work will be completed about August 1. No. 3 is also to be sunk another 400 ft., giving a depth of 1,250 ft.

Iron Silver Mining Company.—The company produced some 90,000 tons during June, principally zinc and iron sulphides, besides doing development and new prospecting work.

Leadville-Oro Leasing Company.—This is a new company, organized to carry on important work through the old Oro workings on Carbonate Hill. Operations will commence on the old Oro shaft, now 325 ft., and it will be sunk 200 ft. deeper.

May Mining Company.—The interest of this company in the Seneca and Ocean claims was sold July 10 at sheriff's sale to satisfy a judgment. The sale brought $2,038.

New Leadville Gold Mining Company.—Manager Deener is operating through Gilt Edge No. 2 shaft at a depth of 500 ft., and has just placed a fine plant of machinery on No. 1 preparatory to sinking and connecting with the other shaft. The combination is virgin territory lying very close to the A. Y. & Minnie mines.

New Leadville Home Mining Company.—No. 4 drill-hole going down has struck ore below the parting quartzite. On top of this formation there were 75 ft. of iron and ore encountered. The quartzite is 20 ft. thick and the cores are bringing up ore.

Ohio & Colorado Smelting and Refining Company.—These people on July 8 adopted the 8-hour system for employees about the furnace only. The company has posted a notice that this is a trial. There is a substantial advance in wages at those hours.

Phoenix Mining Company.—These people are shipping 75 tons daily from the Sixth Street shaft from a fine iron deposit, and are also drifting for the old manganese deposit.

Republic Smelting and Refining Company.—The same parties interested in the Salida plant are in this new plant, which at first was to be simply a pyritic smelter of 500 tons capacity. Manager Goodwin now announces that two lead furnaces have also been ordered and the smelter will be erected on a large scale with a capacity of 1,000 tons daily. J. C. Kortz, J. M. Thomas and other Eastern parties are interested in the new plant, which is to be built on the site of the old Elgin plant.

Wolftone.—Crude ore shipments have been suspended on account of the smelter shut-down. Milling ore is still being extracted. The company is doing some much needed repairing during the lay-off.

SAN JUAN COUNTY.

Little Maude.—This mine, in the San Juan District, is reported sold to Eastern people for $100,000 cash. The property consists of five claims in Maggie Gulch, and it is said the purchasers will begin at once developing the property.

(*From Our Special Correspondent.*)

Saddle.—A New York company has taken an option on this group in United States Basin, and will begin development at once on a large scale.

San Juan Leasing and Mining Company.—This company has filed articles of incorporation to operate several valuable properties in San Juan County.

IDAHO.

ADA COUNTY.

Franklin.—The bond on this property at Pine Grove expired recently. The bond, for $100,000, was about to be taken up, it is said, by Butte men, who desired an extension of three days, which the owners refused to grant.

IDAHO COUNTY.

Salmon River Placers.—These placers on Salmon River, near Goff, are reported sold to a Pittsburg syndicate by William Short and J. O. Lavender, of Goff and W. H. Cassedy, of Grangeville. The property has produced about $30,000. The new company will put a force at work at once.

NEZ PERCE COUNTY.

Moore Creek Placers Company.—This concern was recently incorporated with a capital of $800,000, and the following officers: C. P. Richardson, president; William Steinheiser, vice-president; T. H. Bartlett, secretary and treasurer. The company will operate the Moore Creek placers, near Lewiston. The placers have produced this year about $6,000.

SHOSHONE COUNTY.

Judge Morgan recently issued a restraining order in behalf of the Mammoth and the Standard Mining companies, ordering William T. Hooper, county assessor, to refrain from offering these properties at tax sale, pending the hearing for a perpetual injunction. The properties had been advertized for sale on account of non-payment of taxes. The Mammoth had tendered $4,128.88, and the Standard $3,500 as an equitable payment, which amounts the assessor refused. The taxes of both mines were placed at $19,250.

ILLINOIS.

SANGAMON COUNTY.

Tuxhom Coal Company.—This shaft, which this company has been sinking near the line of the Cincinnati, Hamilton & Dayton Railroad, south of Springfield, has reached the coal. The company expects to begin shipping coal, in a small way, early in the fall.

INDIANA.

(From Our Special Correspondent.)

The joint meeting of the executive boards of the Indiana Miners and Operators held a prolonged meeting at Terre Haute July 9 to arbitrate the differences which caused a strike of 600 miners in the Linton District. The miners contended that the four men discharged at the time the 600 went on strike, and were ordered back to work by President John Mitchell, pending arbitration, should be re-employed, and they would not yield the point that the operators may discharge, at will, for refusal to work on Sundays. The strike was occasioned by the discharge of four engineers and helpers who declined to work on Sunday. The trouble was settled by the arbitrators on the terms that the four men should be re-employed, although not in their original positions.

CLAY COUNTY.

(From Our Special Correspondent.)

An important deal in coal properties of this district was made the past week by which all the Indiana interests of F. S. Peabody, of Chicago, one of the oldest and biggest operators in the State, passed into the hands of John T. Connery, George F. Getz and William H. Baker, all residents of Chicago, and prominent operators. The interests disposed of by Mr. Peabody include some of the most valuable in the block and bituminous districts, with several large mines and extensive coal lands under lease. The entire mining property will be under the supervision of H. V. Sherburne, of Brazil, who is an equal partner with the new purchasers.

Merchants' and Manufacturers' Coal Mining Company.—Thomas Philips has been appointed permanent receiver of this company, a Chicago organization, operating mines in this county.

MARION COUNTY.

(From Our Special Correspondent.)

American Coal and Mineral Mining Company.—This company has been incorporated to mine coal in the Indiana coal-fields. The capital stock is $10,000. The principal office will be in Indianapolis. The officials are: J. E. Lybrand, C. E. Nordyke and G. V. Johnson.

INDIAN TERRITORY.

CHOCTAW NATION.

Buck Coal and Coke Company.—This company has main offices at South McAlester. The capital is $1,500,000, with $450,000 paid in. The incorporators are: J. A. Hill, S. H. Buck, M. H. Briggs, T. W. Pratt, Leonard W. Sweet, J. H. Gordon, J. T. Lockhard and J. H. Allen. The officers are: J. A. Hill, president; Samuel H. Buck, vice-president; J. T. Lockhard, secretary and treasurer. The company has acquired the mines of the McAlister Coal and Mining Company at Buck, and has taken options on several other large properties in the district. The capital comes chiefly from New York.

MARYLAND.

ALLEGHENY COUNTY.

Cumberland Basin Coal Company.—This Baltimore Company will mine and ship coal from property lately acquired in the Georges Creek District. It expects in about 60 days to be shipping from 600 to 1,000 tons daily. Thomas F. McGlone is president and John O. Stafford, secretary and treasurer.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(From Our Special Correspondent.)

Atlantic.—Rock shipments average 1,350 tons daily. Shaft A is down to the 10th level, and producing 250 tons of rock daily. B shaft has reached the 29th level and D shaft the 34th. The rock returned 20 lbs. of mineral per ton last month.

Baltic.—Sinking is confined to Nos. 3, 4 and 5 shafts. No. 3 shaft has reached the 10th level, No. 4 the 8th, and No. 5 the 8th. Nos. 4 and 5 shafts are connected by drifts at the levels above the 9th. Fifty drills are in commission, and rock shipments average 1,800 tons daily. The combined steel shaft and rock house at No. 4 shaft is 36 by 56 ft., with a wing 19.5 by 50 ft. It is 95 ft. high, and the rock bins have a capacity of 800 tons.

Calumet & Hecla.—Preliminary surveys for a narrow-gauge railroad to connect this company's sawmill at Shelldrake with the Duluth, South Shore & Atlantic Railroad at Ekerman, in Chippewa County, a distance of 26 miles, have been finished.

Champion.—The June production of this mine was 764 tons of mineral.

Copper Range Railroad.—Grading for the extension from Houghton to the site of the new smelter has started. The work will be rushed so that the material for the plant can be delivered.

Isle Royale Consolidated.—The June product was 88 tons of refined copper.

Osceola Consolidated.—More drills are being added at the North Kearsarge shafts. The output is increasing gradually, and the full capacity will not be reached until next fall. This mine produced 660 tons of refined copper in June.

Rhode Island.—One stope is being opened at this mine on the West lode, which is showing some copper. No sinking has been done in No. 2 shaft for some time, and other than the stoping all development work is lateral.

Tamarack.—The June production was 525 tons of refined copper. The stamp mill is handling 2,000 tons of rock daily, which returns 21 lb. of fine copper per ton. No. 3 shaft is furnishing a large amount of high-grade rock, but the output of No. 5 shaft, 500 tons daily, is not up to the average.

Trimountain.—The output of this mine in June was 510 tons of refined copper. No. 1 shaft is sinking to the 12th level, No. 2 to the 11th and No. 3 to the 10th. No. 4 shaft is 375 ft. deep. Drifting north at the 3d level is under way. The foundation for the new steel rock house at No. 4 is completed, and the Wisconsin Bridge and Iron Company, of Milwaukee, Wis., starts construction at once.

Winona.—The openings south from No. 2 shaft are in good ground. No. 3 shaft is now down 50 ft. Raising from the 3d and 4th levels south from No. 2 shaft will hasten the work. The rock stamped in June averaged 33 lbs. of mineral per ton. The product of this mine in June was 85 tons of mineral. No. 3, the new shaft, has been started 1,650 ft. south of No. 2 shaft.

Wolverine.—The output of this mine in June was 560 tons of mineral, the largest amount ever secured in any single month.

COPPER—KEWEENAW COUNTY.

(From Our Special Correspondent.)

Mohawk.—Rock from this mine is yielding 26 lbs. of refined copper per ton. Production is derived mainly from Nos. 1 and 2 shafts. There are some large stock piles on surface, which are being shipped to the stamp mill. A stone oil house, 24 by 40 ft., and a 30 by 40-ft. addition to the machine shop are being built. Near No. 4 shaft a dam is being built to supply water for boiler feed and condenser purposes. Work has been started on 15 new double dwelling houses for mine employees.

COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

Adventure Consolidated.—This mine produced 137 tons of refined copper last month.

Mass Consolidated.—The June production was 112 tons of refined copper.

MINNESOTA.

IRON—MESABI RANGE.

(From Our Special Correspondent.)

La Belle Mine.—At this mine, of the La Belle Iron Works, Steubenville, O., shipment of stock has begun. The mine has been sending forward only the comparatively small amount of its daily hoist.

Shenango.—This mine, owned by James McCahill, of Duluth, and under lease to W. P. Snyder & Co., now shows 20,000,000 tons of ore. When the lease was taken there were less than half as much. There may be ore on another 80-acre tract that has not been touched. All ore so far opened by drills is on one 80. The mine will be shipping in a few weeks.

Two or three parties are exploring east of Mesaba station in T. 58, R. 14, and some west of the station. The former are not finding much. Two drills working for E. J. Longyear are in ore near the station, but the quantity is not known. The work west of the station has not been under way long enough to determine the character of the property, but no ore has been found. The Minnesota Iron Company is exploring southwest of the Stephens Mine, and is finding some ore. Eaton and others are exploring south of the Stephens and are locating the extension of an orebody they proved some time ago and then sold. There in some exploration near Virginia, in T. 58, R. 17, especially in State section 15. Not much is being done near Mountain Iron. A number of drills is at work through T. 58, R. 19, west from Mountain Iron, and some ore is showing. Longyear & Hartley have been working there nearly a year, but have ceased, finding nothing. R. Whiteside and D. E. Woodbridge are doing the chief work there now, aside from that under the Minnesota Iron Company, and some to prove further known bodies.

MONTANA.

CASCADE COUNTY.

Home Mining Company.—This recent incorporation, with $200,000 capital, was organized to develop mining porperty at the head of Pilgrim Creek.

DEER LODGE COUNTY.

Hidden Lake Mining Company.—This company, composed of Anaconda men, was incorporated recently to operate property on the eastern slope of Cable Mountain, 15 miles west of Anaconda. The company owns 16 claims, three mill sites and two water rights. The incorporators are D. T. Robinson, R. P. Robinson, T. O'Leary, P. J. Dooley, T. L. Cullen, E. J. Ryan and W. A. Low, all of Anaconda. The capital is $500,000 in $1 shares. The principal office will be at Anaconda.

JEFFERSON COUNTY.

J. H. McCabe has 16 men at work on his property, near Corbin. He will sink two 500-ft. shafts to develop the property, and has located about 50 claims in the Corbin-Wickes District. It is reported that Mr. Moffat, of Denver, is backing Mr. McCabe.

Collorado Mining and Development Company.—This company, which owns the Hidden Treasure and Copper King, in the Corbin District, is preparing to put in heavier machinery, and intends sinking to the 200 ft. and cross-cutting.

Daly.—Ely & Mulvahill, who have a lease on these mines at Wickes, are shipping three cars of high grade copper ore weekly. The capacity of the mill has been increased, and the shaft is to be sunk to the 500-ft. level.

Morning Glory.—Two car-loads of ore were shipped recently to the Tacoma Smelter. The shaft is down to 385 ft.

R. E. Lee.—This mine, in the Rimini District, is about to ship to the concentrator of the Helena & Livingston Company, at Corbin.

Silversmith.—D. J. Sweeney, the lessee of this property, near Basin, recently shipped a car of high-grade silver ore. The ore from the property generally runs from $250 to $300 per ton.

LEWIS & CLARKE COUNTY.

Precious Metals Company.—This company organized recently with headquarters at Helena is capitalized at $5,000,000. The directors are C. R. Tuttle, K. MacNeill, E. R. Pumell, J. Miller Smith, Chas. Boynton, all of Helena; C. W. Munson, of Toledo, O., and F. C. Beach, of New Castle, Pa. The company intends carrying on a general mining, smelting, real estate and investment business.

MADISON COUNTY.

Christiana.—This old mine, in the Ramshorn District, is producing again, being leased to Butte people.

Clipper.—This property, near Pony, is shipping about three cars of ore daily to the Colorado smelter.

Oregon.—Six cars of ore were shipped recently from this mine, near Pony. Charles T. Weidman secured a new lease on the property and intends erecting a 5-stamp mill and concentrator.

U. S. Grant and Fairweather.—These claims, near Virginia City, were recently acquired from John King by Lewis D. McCall and H. A. Hull, of Chicago, the final payment to be made within two weeks. A new stamp mill is to be erected.

PARK COUNTY.

Revenue.—This mill was started recently, and 40 stamps are dropping on Revenue and Legal Tender ores. It is expected that the cyanide plant will be completed by July 15.

SILVER BOW COUNTY.

Black Rock.—It is reported that this property, after 14 years' idleness, is to be opened by Senator W. A. Clark. The shaft is to be sunk to 1,000 ft., and a large force put at development work.

Boston & Montana Company.—The hearing on the petition of John MacGinnis for the appointment of a receiver for this company and for an injunction against the payment of dividends to the Amalgamated Copper Company has, by agreement, been continued until July 20.

Reins Copper Company.—This company, working the Combination Mine, near Butte, will start soon sinking the main shaft an additional 500 ft., or to the 1,000-ft. level. A large hoisting plant has been installed.

NEVADA.

ELKO COUNTY.

(From Our Special Correspondent.)

Dexter.—The installation of the Moore slimes process, Managing Director E. O. Lee, of Salt Lake, announces, will be completed early in August. The mill is treating about 100 tons of ore per day. The first month's run, since resuming operations, yielded gold bullion valued at over $12,000.

WHITE PINE COUNTY.

New York & Nevada Mining Company.—A new boiler and engine has been installed at the No. 2 shaft on this company's properties at Copper Flat. A large force is employed. Mr. Shaw is superintendent.

NORTH CADOLINA.

MONTGOMERY COUNTY.

(From Our Special Correspondent.)

The Whitney Company is developing 46,000 h.p. on the Yadkin River. It built 6½ miles of standard gauge railroad last spring to get in machinery and material to the dam site, but owing to litigation with the contractor over alleged breach of contract, work on the dam has been delayed. The matter has now been submitted to an arbitrator.

Russell.—About four weeks ago the Whitney Reduction Company purchased this old mine, in Montgomery County, that has been called the largest low-grade gold proposition in the Eastern States, the vein being 150 ft. wide. Up to the beginning of the Civil War the property was credited with producing $1,000,000, chiefly by open-cut work. The Whitney Company has also taken a working bond on the Coggins Mine, formerly known as the Appalachian, the southern extension of the Russell.

STANLEY COUNTY.

(*From Our Special Correspondent.*)

Barringer.—This old mine, supposed to have been worked out before the war, was recently acquired by the Whitney Reduction Company, headed by George I. Whitney, of Pittsburg, of which E. B. C. Hambley is president. Recently a vein about 4 ft. thick, with a pay streak of 2.5 ins. on the foot wall, was cut. This pay streak is reported to average $20,000 per ton in gold, and about 6 tons have been taken out. The ore now has 30 ft. backs, and is 30 ft. long. The formation is a close-grained igneous rock, and shows tellurides. The main shaft is 100 ft. deep. The rich ore is on a contact between the close-grained rock and diabase. The Whitney Company is also sinking an 8 by 16 ft. shaft on the Isenhon property, acquired from State Senator Betts, of Colorado.

PENNSYLVANIA.

BITUMINOUS COAL.

Webster Coal and Coke Company.—This company, now operating 16 mines in Cambria County, is preparing to open four new mines between Ashville and Amsbry, on the Cresson & Coalport branch of the Cambria & Clearfield division of the Pennsylvania Railroad.

SOUTH DAKOTA.

CUSTER COUNTY.

(*From Our Special Correspondent.*)

Black Hills Porcelain Clay and Marble Company.—The directors elected officers as follows: J. H. Chamber, president; R. L. Boyer, vice-president; Wesley Schlichter, secretary and treasurer. L. P. Woodbury has resigned as general manager.

LAWRENCE COUNTY.

(*From Our Special Correspondent.*)

Pennsylvania Mining Company.—New hoisting machinery is being set up at the shaft along Deadwood Gulch. N. H. Schenk is general manager, with headquarters at Deadwood.

Wasp Number Two Mining Company.—The power plant in the cyanide mill has been repaired after a four days' shutdown, the longest since the mill was started. The plant is treating on the average 125 tons of ore per day.

PENNINGTON COUNTY.

(*From Our Special Correspondent.*)

Cumberland Mining Company.—The J. R. shaft is 500 ft. deep, and the company is preparing to begin drifting on the vein. Work has been suspended pending the installation of an air compressor.

Sunbeam Mining Company.—A 20-stamp mill is being built on Friday Gulch, and will be ready to run before the end of summer. The shaft is 300 ft. deep, and drifts have been driven both ways on the vein from the bottom. A large amount of good ore has been taken out in sinking the shaft.

TEXAS.

HARDIN COUNTY.

(*From Our Special Correspondent.*)

The fire on block 8 on June 23 looked dangerous, but did very little damage. The field proved so far seems to cover about 1,200 acres. Crude oil has slumped from 63 to 50c. a bbl.

Sour Lake Oil Field.—The Moonshine Oil Co. has a new well in the Shoestring tract; it is only 400 ft. deep. Roberts well No. 1 is in at 650 ft. Abercrombie & Little well No. 2 was brought in at 650 ft. Walter Sharp has a new gusher in the Shoestring tract, said to be good for 5,000 bbls. daily. The Moore Skinner Company is constructing a 100,000-bbl. earthen tank. The Spindletop Power Company No. 1 has been finished; it is 700 ft. deep and a good producer. The Black Hawk Oil Company and the Chicago Milwaukee Oil Company have each purchased an acre in the Shoestring Tract, and will drill wells.

NASOGDOCHES COUNTY.

(*From Our Special Correspondent.*)

Nasogdoches.—The oil boom here has flickered out. Some 25 shallow wells were drilled by the Houston Oil Company, which found traces of oil in nearly all of them, but not in paying quantities.

UTAH.

(*From Our Special Correspondent.*)

Ore and Bullion Shipments.—Salt Lake banks reported settlements for the week ending July 10, amounting to $277,500, as follows: Crude ores and concentrates, $107,700; base bullion, $156,000; gold bars, $13,800.

BAKER COUNTY.

(*From Our Special Correspondent.*)

Lincoln.—Near Minersville the first metal mine discovered in Utah was sold by the sheriff to Frank Frour, of Lincoln, Ill., for $58,747, on July 6.

Newhouse Mines and Smelters.—Preliminaries are being rapidly arranged for the construction of the concentrator and smelter. The first contract to be let will be for the building of a 12-mile pipe line from Wah Wah Springs, the source of water supply.

GRAND COUNTY.

(*From Our Special Correspondent.*)

Intermountain Asphalt Company.—This corporation formed under South Dakota laws, will develop 480 acres of ground in Grand County. The capital is $250,000 in $5 shares. The officers are: William H. Innes, of Boise, president; R. W. Shuttler, of Salt Lake, vice-president; Nels Forsberg, of Salt Lake, secretary; Truman Schenck, treasurer, who, with A. G. Mahan, of Salt Lake, constitute the board of directors. A contract has been let to A. T. Davis, of Berkeley, Cal., to erect a 100-ton refinery.

JUAB COUNTY.

(*From Our Special Correspondent.*)

Tintic Shipments.—For the week ending July 10 shipments amounted to 53 car-loads, as follows: Black Jack, 11; Bullion-Beck, 6; Centennial-Eureka, 18; Gemini, 6; Grand Central, 6; Lower Mammoth, 1; Mammoth, 5.

SALT LAKE COUNTY.

(*From Our Special Correspondent.*)

Bingham Consolidated Smelter.—Shipments of copper bullion in June amounted to 727,286 lbs., and for the week ending July 3, 3 cars, 181,400 lbs.

Continental Mines and Smelting Company.—This corporation, through its managing director, Henry M. Crowther, of Salt Lake, has closed a deal for the purchase of the Regulator, Grizzly, Lavina and Darlington properties at Alta. Development has been started.

United States Smelter.—Shipments of copper bullion in June amounted to 856,520 lbs. During the week ending July 3, 3 cars, 181,218 lbs.

Utah Consolidated Smelter.—Shipments of copper bullion in the month of June amounted to 962,880 lbs., and for week ending July 3, 4 cars, 241,000 lbs.

Utah Copper Company.—Manager D. C. Jackling has announced that work will commence on the construction of the new 500-ton concentrator at Bingham within 30 days.

SUMMIT COUNTY.

(*From Our Special Correspondent.*)

Park City Shipments.—For the week ending July 10 the shipments in pounds were: Daly-West, 3,049,000; Loring Brothers, 65,000; total, 3,114,000 lbs.

Comstock.—At a meeting of the directors held in Salt Lake City, the following officers were elected: President, A. Hanauer, Jr.; treasurer, A. Hanauer, Sr.; manager, George R. Hancock. The shaft, now 400 ft. deep, is to be continued to the 700-ft. level.

Daly.—The old hoisting works at this property was destroyed by fire on July 8. The origin is unknown.

WEST VIRGINIA.

MARION COUNTY.

Col. James M. Guffey, of Pittsburg, Pa., recently sold 68,000 acres of coal land, near Fairmont, in the Pittsburg vein, to the St. Louis Union Trust Company for $2,389,698, of which he received $1,025,398 in cash.

A large tract of sand in the St. Mary's District, and in the Wolf Creek and Chester Hill Districts in Washington and Morgan counties, Ohio, was leased recently from the Octo Oil Company, of Pittsburg, Pa., by Franklin R. Anson, of New York City, for $350,000. The leases cover about 1,500 acres of territory and 27 producing wells outputting about 350 bbls. a day.

Powell Coal and Coke Company.—Arrangements were made recently for erecting 100 coke ovens at Powells. Upon completion work on 100 additional ovens is to be started. The company recently acquired 6,000 acres of coal land, between Grafton and Fairmont, on the Baltimore & Ohio. A coal washer of 800-tons daily capacity has been ordered from the Link-Belt Machinery Company, of Chicago, Ill.

WETZEL COUNTY.

Pittsburg & Fairmont Fuel Company.—This New York company, capitalized at $2,250,000, purchased recently about $16,000 acres of coal land for $1,500,000. The purchase consisted of the property owned by the Perry Coal and Coke Company at Adamston, the Pooze Coal and Coke Company's plant, near Lumberport, and the Howard Coal and Coke Company's mines and property at Wilsonburg.

WYOMING.

ALBANY COUNTY.

Acme Gold and Copper Mining and Milling Company.—This concern was recently organized to take over the stock and properties at Gold Hill, southwest of Laramie, of the Wyoming Development and Transportation Company. The capital is $400,000 in $4 shares. A mill was built on the property a few years ago, and at present the Laramie, Hahn's Peak & Pacific Railroad is under construction.

CARBON COUNTY.

North American Copper Company.—The concentrator at this company's smelter has started. About 600 tons ore daily are brought by the tramway from the Ferris-Haggarty Mine. A large number of the stockholders will see the smelter blown in. A 25-drill air compressor for the Ferris-Haggarty Mine arrived at Encampment recently, and will be hauled to the property at Butte as soon as the roads permit.

MINING STOCKS.

(Full quotations are given on pages 110 and 111.)

New York July 15.

The heavy liquidation of the past few weeks, and the seeming indifference of leading financiers, resulted on Monday in establishing a new record of low prices. No mercy has been shown by the bears, be the stock "protected" by insiders or a free lance for speculators, all were hammered. This onslaught has not yet caused the failure of any important brokerage firm, which makes it evident that the big moneyed men have been the heaviest losers. To the experienced operator the situation looks critical, while to the investor prices are too weak to induce him to increase his holdings. All look for a rehabilitation of the market through outside buying, particularly from London. Should a recovery come soon the shorts will have to scramble hard to save themselves. This alone will force prices upward.

The coppers have had a bad week. Amalgamated broke the so-called dead line at $50 on July 13, when it sold down to $48¾. This price, while yielding about half the original dividend of 8 per cent per annum, makes the market value of the company's holdings less than half the capitalization. Of course, there had to be a recovery to $50¾ before the close of the day, to stop the increasing liquidation, but on July 15 the price broke again 48¼. Anaconda was within a small fraction of its lowest price, selling down to $20⅛ early Monday, but subsequently recovered to $20.53, and on Wednesday dropped to $19⅞. At $19⅞ Anaconda markets is property at $6,150,000 less than its capitalization. Greene Consolidated, of Mexico, after a short spell of activity has again fallen into a lethargic condition, and is selling around $20. Small sales of United, of Montana, have been made at $18⅛@$19¼. Tennessee was quiet at $30.

The gold and silver stocks have also suffered a decline. It is surprising to see the Comstock assessment stocks selling above Cripple Creek dividend payers. Portland, of Cripple Creek, hangs at $1.30, notwithstanding the declaration of the regular 3c. quarterly dividend. Vindicator, a 22 per cent dividend stock, is selling at 80c. Isabella continues to fall, and this week touched 10½c. The company is having a hard time making ends meet, and, to cap the climax, a damage suit has been brought by another property. El Paso reappeared at 58c. Of the Comstocks Consolidated California & Virginia sold at $1.35; Ophir at $1.50, and Yellow Jacket at 76@77c.

Colorado Springs. July 9.

(*From Our Special Correspondent.*)

The smelter strike, which has extended to the Standard Mill of the United States Reduction and Refining Company, at Colorado City, is now one week old, and during that period has not brought forth any developments worthy of note. The idle men at the Denver plants are well behaved, and so far no serious disturbances have resulted, although no attempts have been made to start up any of the plants. The Colorado City mill is running a little short-handed, but so far without any trouble. The most significant development in the opposition this week is the rapid formation of what is called the Citizens' alliance, which is a banding together of the various property interests of this section, taking in the mine, mill, smelter and mercantile interests in one body to combat the labor unions. The movement is progressing quietly, but is receiving strong backing throughout the city and elsewhere.

As to the market, trading during the week was generally light, but prices were in the main strong. The strike has had but little effect so far. Isabella broke to 11, owing to a suit for $1,250,000 damages for ore alleged to have been extracted by the Isabella Company from the territory of the Orphan Company. The suit in mining circles is generally regarded as without merit. Vindicator fell off to 88 during the week, but recovered to-day to 90. The company will declare the regular quarterly dividend this month. Portland has been inactive this week and generally weak. The big $750,000 chlorination mill at Colorado City, belonging to this company, is shut down for repairs, and will not resume work until July 15 or later. The directors met July 5, and declared the regular quarterly dividend of $90,000, being at the rate of 3c. a share. There was little else of note in the market this week.

San Francisco. July 11.

(From Our Special Correspondent.)

On the old Exchange business was rather quiet after the long holiday, and prices were not particularly strong. Some of the North End stocks were rather firmer, but the Gold Hill shares were generally weak. Ophir brought $1.70@$1.75; Consolidated California & Virginia, $1.65; Mexican, $1.25; Silver Hill, $1@$1.05; Yellow Jacket, 78c.; Sierra Nevada, 72c.; Crown Point, 28c.; Chollar, 25c.

On the San Francisco & Tonopah Exchange business was rather quiet, but values were well sustained, and some stocks showed small advances. The greatest demand was for Rescue, which seemed to be very firmly held. Some quotations noted are Tonopah Belmont, $2.15@$2.20; Montana Tonopah, $1; Tonopah North Star, 45@50c.; Rescue, 14@15c.

In oil shares sales were rather limited, only a few stocks out of the list being dealt in. Prices, however, were quite firm. Cypress sold for $6.25; Kern Oil, $5.50; Twenty-eight, $3.50; Senator, 70c.; Sovereign, 37c.; Junction, 22c.; California Standard, 13c. A few sales of Caribou were made at 90c., but holders decline to part with the stock at that quotation.

COAL TRADE REVIEW.

New York, July 15.

ANTHRACITE.

The anthracite coal market presents this week nothing new, and we can do little beyond repeating last week's statements. This does not imply that the market is stagnant by any means. The trade was never in a better condition at this season. Production continues at a rate unprecedented for the summer months, but the coal is all absorbed as fast as delivered, and little or none is going to the storage yards. In New York and other large Eastern cities, dealers report a steady demand, and they say householders are filling their cellars, and storing up coal, to an extent never before known in July. The demand for coal in Northern New England, in Northern New York and in Canada also, continues without abatement, and coal is going forward steadily to all that region.

The Lake trade is also making pretty heavy demands. Some complaint is heard about shortage of cars to Buffalo and other Lake ports, but the railroads are doing their best to remedy this. Difficulties about vessels are practically over, and shipments are being freely made.

Prices continue unchanged at the July discount. The regular prices for free-burning white ash coal, f.o.b. New York Harbor shipping port, are: Broken, $4.55; egg, stove and chestnut, $4.80. Steam coal continues to sell freely at about $3 for good grades of pea; $2.50 for No. 1 buckwheat, and $2@$2.25 for No. 2 buckwheat or rice. It is stated that some small premiums have been paid on coal going to New England ports, and also on coal for Montreal and Eastern Canada.

At a meeting held at the office of the Trunk Line Association in New York, July 11, it is understood that the difficulties between the New York, New Haven & Hartford Company, and the anthracite carrying lines were settled. The New Haven people have been paying special attention to the coal trade lately, and demand a larger proportion of the through rate on anthracite to interior New England points. It is understood that this claim was recognized, and some concessions made. It is not stated whether these concessions will apply also to anthracite going by way of Newburg and Fishkill Landing.

BITUMINOUS.

The Atlantic seaboard soft coal trade is quiet, but there is a little better tone than last week. No radical change is expected, however, until fall buying commences some time next month.

Far Eastern trade is quiet. Orders in the hands of shippers are fair, but the great shortage in available vessels delays shipments. Some relief should be here soon, if the weather continues as fair as it has recently been. Long Island Sound business is listless, as nobody seems to be anxious for coal at this time.

In New York Harbor territory nothing of importance is being done, owing to the freer offerings of small sizes of anthracite, and the crusade of the board of health against bituminous coal. Prices for soft coal vary from $2.50@$2.85 per ton, f.o.b. New York Harbor.

Consumers in the all-rail trade are taking about 75 per cent of their contracts. Transportation from mines to tide is fairly good, coal running through in five days to a week. The car supply is improving, shippers getting generally about 75 per cent of their needs.

In the coastwise market vessels are scarce and in demand. We quote current rates of freight from Philadelphia: To Portland, 90@95c.; Portsmouth and Bath, 95c.; Salem, 90c.@$1.10; Newburyport, $1.15; Saco, $1.20 and towages; Gardiner, $1.05@$1.10 and towages; Providence, New Bedford and the Sound, 80c.; Bangor, $1.10. From New York Harbor ports to Boston, Salem and Portland, $1@$1.25; the Sound, 75c.

Birmingham. July 13.

(From Our Special Correspondent.)

Coal production in Alabama is now off more than 75 per cent. The miners belonging to the United Mine Workers of America who are remaining out of the mines, because of no contract with the operators, are orderly. There appears to be but little possibility for the settling of the differences this week. Already the suspension is injuring business in the Birmingham District. Fourteen thousand men are directly interested in this suspension of work at the mines, while several thousand others are also affected. Several of the smaller mines in the district have signed temporary contracts granting the demands of the miners until such time as a general contract shall be made. The Jenifer Furnace Company has signed such a temporary contract, and its mines at Connellsville, in the Blue Creek region are in full operation. The mines in Walker and Marion counties are still in full operation, but they furnish less than 25 per cent of the entire production of the State. The mines in Jefferson County, in which convict labor is employed, are turning out a good quantity of coal.

While the miners are idle considerable repairing is being done at various mines in this State. The Tennessee Coal, Iron and Railroad Company is putting up a 1,200-ton coal washer and a self-acting tipple.

No efforts have been made as yet to replace the United Mine Workers with non-union men.

Chicago. July 13.

(From Our Special Correspondent.)

Anthracite sales continue heavy. The experience of June, when wholesalers were flooded with orders from both city and country, bids fair to be repeated in this month, notwithstanding that it is time normally for the summer slackness to set in. The 10c. advance of July 1 apparently had no effect upon buyers; until the deficiency caused by the famine of last winter has been fully made up, retailers and consumers will continue to buy anthracite as fast as they can get it. Egg continues to be most in demand, but no grade is plentiful, unless it be chestnut, for which the demand seems to be least.

The threshing season is now on for the Western market supplied from Chicago, and dealers report the demand unusually heavy for Hocking, Indiana block and the better grades of Illinois bituminous. This partly compensates for the usual summer slackness in bituminous, but in general it cannot be said that there is much market for Western coals now. Smokeless is also in light demand, and has probably been sold as low as $3.30, though nominally remaining at $3.50. Hocking brings $3.50, and is in the best demand of bituminous grades; Youghiogheny is at $3.60, and is in fairly stable condition; Illinois and Indiana lump and egg bring generally $2@$2.10. The market for Western bituminous in the city is notably slack, most, if not at all, of the demand being from the country.

Cleveland. July 14.

(From Our Special Correspondent.)

Some interesting figures have been compiled concerning the coal trade of the lakes. These show that the shipments up the lakes have been heavier this year than last by about 800,000 tons. This is based, of course, on the movement through the Sault canals alone, and does not take into account that movement through the Straits of Mackinac, which has been much heavier than last year. The probable increase in the shipment over last year will be 1,000,000 tons for thus far this season. It has been generally stated that this is a good showing for the coal shippers, but it must be confessed thta the situation is a little discouraging. It is to be recalled that the coal strike last summer prevented any shipments of hard coal during a part of the month of May and the month of June. The whole season shipment was far short of the needs, and there was a general distress at the head of the lakes. It was naturally supposed that the movement would be much heavier this year. The season is more than one-third gone, and yet a gain of but 1,000,000 tons is shown over last year. This figures up about a gain of 2,500,000 tons over the whole season of 1902, which is hardly adequate.

The general coal situation on the lakes is rather easy just now. The movement is comparatively light, and the congestion which existed last week has about disapeared. Very little is being heard of coal sales. Lake coal prices hold at $2.45 for Pittsburg and West Virginia lump, as a basis, and $2.35 for Ohio lump. The domestic situation is strong, with a good demand in all quarters. Prices are holding firm, and the market is steady. The coke situation is improving slightly and the furnaces in the Valleys are getting all they need. The general coke situation is easy, with the supply adequate in all instances.

Pittsburg. July 14.

(From Our Special Correspondent.)

Coal.—The demand this week has fallen off slightly, probably on account of the closing of some of the mills for annual repairs; but prices are firm. The railroad car supply continues good, and all the mines are busy. It is now estimated that the shipments to the lake ports for the Northwestern trade will exceed last season by fully 1,000,000 tons. Some doubt is expressed, however, as to the ability of the railroads to continue in the coal traffic all the cars needed.

Connellsville Coke.—The demand for standard Connellsville coke is improving, and prices are firm, furnace coke being quoted at a minimum of $3 a ton and foundry ranging from $3.75 to $4.25. The price of outside coke is declining, as it is not in good demand when the supply of the strictly Connellsville product is good. The *Courier* in its last report gives the production for the previous week at 233,928 tons, the loss being due to the fact that the ovens were only operated five days in the week. The shipments aggregated 11,100 cars, distributed as follows: To Pittsburg and river tipples, 4,480 cars; to points west of Pittsburg, 5,122 cars; to points east of Connellsville, 490 cars.

San Francisco. July 4.

(From Our Special Correspondent.)

Trade has been slightly more active, although sales of fuel oil continue to interfere somewhat with coal. Arrivals have been rather light, but there are sufficient stocks on hand. Prices show no change.

Yard prices for Pacific Coast coal to dealers in large lots are as follows: Wellington and New Wellington, $8; Richmond, $7.50; Roslyn, $7; Seattle, $6.50; Bryant, $6.50; Coos Bay, $4.50. Rocky Mountain coals in large lots, ex-car, are quoted at $14 for Cofo-rado anthracite and $8.50 for Utah and Wyoming coals. Eastern coal is scarce, but quotations remain nominally at $14 for Pennsylvania anthracite and $13 for Cumberland in cargo lots. Foreign coal sells in large lots as follows: Welsh anthracite, $13; cannel, $8.50; Byrmbo and Wallsend, $7.50.

Foreign Coal Trade. July 16.

The coal production of Germany for the five months ending May 31 is reported as follows, in metric tons:

	1902.	1903.	Changes.
Coal	42,381,344	46,638,974	I. 4,257,630
Brown coal	16,825,115	17,839,326	I. 1,014,211
Total mined	59,206,459	64,478,300	I. 5,271,841
Coke made	3,564,548	4,592,283	I. 1,027,735
Briquettes made	3,461,935	4,002,600	I. 541,665

This shows a considerable gain this year. The briquettes are made chiefly from brown coal.

Imports of coal into Germany for the five months ending May 31 were as follows, in metric tons:

	1902.	1903.	Changes.
Coal	2,283,141	2,449,375	I. 166,234
Brown coal	3,125,354	3,318,029	D. 192,675
Coke	150,132	171,180	I. 21,048
Totals	5,558,627	5,938,584	I. 379,957

The chief imports of coal were from Great Britain; of brown coal from Austria.

Exports of fuel from Germany for the five months ending May 31 were as follows, in metric tons:

	1902.	1903.	Changes.
Coal	5,925,080	6,913,262	I. 988,182
Brown coal	7,614	10,187	I. 2,573
Coke	749,568	1,035,195	I. 285,627
Totals	6,682,262	7,958,644	I. 1,276,382

The chief exports of coal were to Austria, Holland, Belgium and Switzerland; of coke to France and Belgium. There were 2,013 tons of coke reported shipped to the United States this year.

Messrs. Hull, Blyth & Co., of Cardiff and London, report, under date of July 3, that the demand for large coal, both Cardiff and Monmouthshire, is better and prices for these descriptions are firmer. Smalls remain steady. Quotations are: Best Welsh steam coal, $3.78@$3.84; seconds, $3.66; thirds, $3.54; dry coals, $3.48; best Monmouthshire, $3.30@$3.36; seconds, $3.24; best small steam coal, $2.10; seconds, $1.98; other sorts, $1.86.

The above prices for Cardiff coals are all, f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½ per cent discount.

There is no change to report with regard to the freight market, which remains steady with tonnage not too plentiful. Some rates quoted from Cardiff are: Marseilles, $1.45; Genoa, $1.66; Naples, $1.50; Singapore, $2.52; Las Palmas, $1.50; St. Vincent, $1.62; Rio Janeiro, $2.16; Santos, $2.64; Buenos, $1.92.

IRON TRADE REVIEW.

New York, July 16.

A concerted effort is evidently being made to represent the iron market as in an exceptionally strong position, and to resist any future concessions in prices. The press bureaus are being industriously worked, and have succeeded in capturing some so-called representatives of the trade; on the other hand, reports continue to be circulated of concessions in prices, which are, to a certain extent, exaggerated. The trade position is certainly a peculiar one. Manufacturers continue busy on contracts, although most of them have caught up fairly well with their orders, and premiums for se-

curing early deliveries are a thing of the past. All the larger mills have contracted for their raw material for the third quarter of the year, and those who purchase pig and billets are holding back on their fourth-quarter contracts, with a unanimity which would almost seem to imply agreement, although it is not probable that any regular understanding has been entered into. The same thing may be said of machinery manufacturers, car builders and others, who purchase material in more finished form, such as bars, plates, shapes, etc. While it is certain that many of these people must come into the market before October, the waiting policy has had a decided effect, and its results are beginning to be shown in the weakening of prices for pig iron and billets, and by willingness of makers to grant concessions on other material. This has been somewhat emphasized by the troubles in the building trade, which have held up the demand for structural material. This has been unusually light for the first part of the summer, and the troubles have also affected some of the minor branches, such as nails, etc. A marked feature of the week has been the reduction of $1.50 per ton on pig iron made by the Southern furnaces. Cutting had already been reported by outside furnaces, and this has now been made by the Association, which has put the price on the basis of $14, Birmingham, for No. 2 foundry. Northern and Western makers will undoubtedly have to follow.

This drop in prices does not mean that the iron trade is on the down grade, so far as consumption and demand are concerned. There is no sign of any immediate slackening in business, and the encouraging crop reports indicate that money will be sufficiently plentiful and the demand for material good, at least well into next year. The level of prices, however, has been so far beyond the normal that a return to lower quotations was imperatively demanded, and it is perhaps a fortunate matter that we are gradually approaching a sounder basis than that on which we have been running for the greater part of the past year. An encouraging feature is that the probable early settlement of the building strikes will give a considerable impetus to the demand for structural material. It is altogether likely also that some of the railroad improvements, which have been postponed, will be begun shortly, provided reasonable prices can be assured.

United Steel Corporation stocks this week have reached the lowest level on record since their first issue. This is part of the liquidation, which has been going on in Wall Street. It is altogether probable that the point now attained is as much too low as the original one was too high. This, however, is an inevitable incident of all such movements, and a recovery may be expected in due time.

Exports of pig iron from Germany, for the five months ending May 31, were 209,280 metric tons, against 115,958 tons in the corresponding period in 1902; showing an increase of 93,322 tons. The larger part of this gain was in exports to the United States. Exports of iron and steel of all kinds, except pig iron, amounted to 1,330,078 tons this year, showing an increase of 209,743 tons, as compared with 1902. The particulars of these exports are not given in the report. The imports of iron ore, for the five months, were 1,736,661 tons, against 1,271,097 tons in 1902. These imports were chiefly from Spain and Sweden. Exports of iron ore were 1,397,904 tons, against 1,091,405 tons last year. These exports are chiefly minette ores from Luxemberg, which went to France and Germany.

Birmingham. July 13.

(From Our Special Correspondent.)

Another reduction in quotations has been made in Southern iron. Representatives of companies in the Association held a meeting in Chicago on Friday, and decided on a reduction of $1.50 per ton. The consuming element is again victorious in its game of waiting, and a new schedule of prices has been made as follows: No. 1 foundry, $14; No. 2 foundry, $13.50; No. 3 foundry, $13; No. 4 foundry, $12.50; gray forge, $12@$12.50; No. 1 soft, $14; No. 2 soft, $13.50.

When the second reduction in quotations was made by the Southern Association on June 2, of from $1.50 to $2.50 per ton, it was expected that there would be a rush for the iron. The consumers, however, were not satisfied with this price, and held away from the market. The buying was in small lots and on quick delivery. There is still some intimation that prices are to go still lower, and it is to be heard that non-Association furnaces have been quoting No. 2 foundry iron at $13 per ton, while No. 3 foundry has been offered at $12. An Association furnaceman, speaking as he felt on the day after the reduction was made last week, said: "I would not be surprised to see iron go down to $10 per ton." It is hardly expected that the product will take as great a fall as that, even with two or more reductions.

The coal miners' strike has caused a big reduction in the coal output of the State, and consequently in the coke production. During the past week, the Lacey-Buek Iron Company closed down Trussville furnace, but it was announced that it was done for repairs. This furnace will be enlarged and a skip hoist added. Vanderbilt furnace of the Tutweiler Coal and Iron Company has also shut down, and this is charged to the strike. It is understood that the Sloss-Sheffield Steel and Iron Company and the Tennessee Coal, Iron and Railroad Company will blow out some furnaces during this week, if the miners' trouble does not come to end rapidly. The Woodstock Iron Company will blow in one of its Anniston furnaces this week. This company has a large supply of coal and coke on hand.

The rolling mills have not resumed work yet in this district. Bar iron prices were reduced at a recent meeting held in Chattanooga, Tenn., and there is yet considerable stock on hand at the mills.

In the steel industry there is much activity in this district. The big steel plant of the Tennessee Company at Ensley is busy, and there is a good demand for all the product being turned out. The steel rail mill department in particular is doing well, and preparations are being made to enlarge it.

Chicago. July 13.

(From Our Special Correspondent.)

There is no break in the downward tendency of the pig-iron market, due to slackness of buying. The Southern Association, in meeting here last week, fixed the price of No. 2 Southern at $13.50, Birmingham, or $17.85, Chicago, a nominal reduction from the $15 price that has been quoted only to be ignored in actual sales, for several weeks past. Inasmuch as the price made and now acknowledged by independent furnaces has been as low as $13 for two or three weeks past, the feeling is that the $13.50 mark will not help anybody. The market is aparently a settling one, bound to go to the bottom, regardless of attempts by any combination to control it. Representative sellers of iron profess not to be able to see the bottom at present, nor at any time in the near future.

Small sales, both in quantity and number, and for speedy delivery have characterized the market for the week, as heretofore. In part it is felt that the present situation is due to the customary midsummer slackness, but beyond this is a general condition of positive refusal by the foundryman to buy more iron than he absolutely needs for immediate use. Coke is overabundant; the railroad yards are full of it and spot sales have been made below $5, the supposed minimum of quotations. Shipments of coke are being restricted in consequence of the present demoralization, and next week will probably see a better condition.

Cleveland. July 14.

(From Our Special Correspondent.)

Iron Ore.—The shippers and vessel owners of the lakes are beginning to see the end of the long delays that have hampered the boats carrying ore. Vessel owners have been demanding higher rates of freight, but shippers are contending for a reduction. The situation is complex, with rates unchanged. They are: Duluth, 80c.; Marquette, 70c., and Escanaba, 60c. A few inquiries have been made for ore, but no sales reported. The prices hold at $4.50 for bessemer old range and $4 for bessemer Mesabi. The movement of ore down the lakes to July 1 was 8,237,929 tons, a decrease from last year of 661,904 tons.

Pig Iron.—Inquiries for foundry have been heavier, but with no sales reported. The market is inactive at the old prices. The quotations are $18@$18.50, Valley furnace, for No. 2. Southern Ohio furnaces are quoting a price equal to $18.50, Cleveland. There has been a fair call for malleable, which is being sold at $18.50 in the Valleys. Gray forge is in slight demand, wit hsome light transactions reported. The price has held without change at $18 in the Valleys, through the second half. The Southern Association furnaces have been selling material here—or offering it for sale—at $13.50, Birmingham. This is meeting the price at which th eindependent furnaces have been selling material. Both classes of furnaces are now selling at the same price. This has not changed the Northern situation appreciably. The inquiry for bessemer and basic has increased a little, but as yet no sales have been reported of any consequence. The prices hold nominally as they were, at $18.50@$18.33, Valley furnace, for bessemer, and $18.75 for basic.

Finished Material.—The market generally has been weak with no sales of any importance in any of the grades. The market is strong, nevertheless. Plates have been fairly strong, with small buying prevailing, and yet with hardly any big sales of moment. The specification against old contracts have been heavier. The smaller mills are still getting a reasonable portion of the business, but are not able to get much more than $3 or $4 premium on their material. All mills are making deliveries in three or four weeks. The standard, or association, price is 1.60c., Pittsburg. The call for structural material has improved, with some further evidences of increasing activity. The inquiries recently placed have not resulted in any ordering of importance. The jobbers are doing a little business, but their prices have not improved. The quotations are 1.60c., Pittsburg, from the mills, and 2.15c., out of stock, Cleveland. The sheet trade is dull. The reports of price cutting have been spread again, but it is not learned that they have been at all general. The business is done through the jobbers, and is steady. Prices are based on a quotation of 3.15c. for No. 27 black sheets, out of stock, and 4c. for galvanized sheets out of stock. The gauges between sheets and plates are hard to obtain, and the market is steady. Bar iron has been practically off the market. The dealers have had little to sell, and the buyers have not been anxious. The prices have dropped slightly, the quotation now being 1.65@1.70c., Youngstown. The demand for steel bars has not increased, and the market is generally easy. Midsummer dullness best expresses the state of this trade. The prices have not changed, being 1.60c., Pittsburg, for bessemer, and 1.70c., Pittsburg, for open-hearth. There has been a better call for billets, and some sales by outside concerns. The price has held at $28.50 @$29, Pittsburg, for bessemer 4 by 4. There is but little interest here in the rail trade, except from the electric lines, and that trade has about been exhausted for the time being. The price is $28, Pittsburg, for standard sections.

Old Material.—The market has been a little stronger, with a few sales at reduced prices. The market has not yet settled, and it is seemingly assured that prices will drop materially before any large transactions occur.

Philadelphia. July 15.

(From Our Special Correspondent.)

Pig Iron.—Our pig iron brokers report much more inquiry during the past few days and some improvement in selling, but not enough to warrant any predictions. The present demand is for small lots for immediate use. The larger consumers refuse to cover as they did at this time last year. They have been advised by makers to consider carefully their policy, but buyers generally adhere to the opinion that pig iron has a lower level yet to reach. Makers, when they can be induced to express a confident opinion, say that there is less room for a decline in values than buyers imagine. There is no accumulation of stocks, they point out, and while there is considerable unsold capacity, especially for foundry and forge iron, their figuring of this year's requirements shows that everything that furnaces can make will be wanted. Buyers, on the other hand, point to the steady decline in prices of pig iron in the past two months, and confidently assert that the bottom has not yet been recahed. Quotations may be given at $18 for basic; $17.25 for gray forge up to $18; $17.75@$18 for No. 2 plain. No. 2X foundry is quoted at $18.50.

Steel Billets.—The reported drop to $27 is expected to result in the placing of billet business, which has been held back for some time in view of such reduction. Considerable business has been sent to mills, and the tone in this market has been strengthened by the reported closing of several large lots.

Bars.—Bar orders are held in reserve, excepting for small lots to piece out. It is rumored to-day that a cut has been made on common bars at the behest of large car-building interests, who, in consequence, have just placed orders for late autumn requirements. It is also said that further large orders will come from this source. The retail demand in bars is perceptibly better, and the storekeepers are working off double the quantity they did in June.

Sheets.—The sheet market is active in a retail way, but the expected July business from the large buyers is still in abeyance. Buyers are standing off for concessions.

Boiler Tubes.—The demand for boiler tubes continues very heavy, and since Monday quite a lot of business has been closed, presumably at top figures.

Pipes.—Merchant pipe, and all other kinds, sell well, and the constant inquiry made shows that there is a very heavy demand yet to be provided for.

Skelp Iron.—A number of interests, that were on the point of closing for skelp in June, are back again in this market, but as yet they have done nothing, although it is understood that they are in rather urgent need of material.

Merchant Steel.—The merchant steel demand is disappointing for July. The hardware and vehicle interests that make a strong impression on merchant steel in mid-summer are holding back and buying only in a hand-to-mouth way.

Plates.—There are rumors of a general and sweeping cut in plate, but nothing has been done in a large way this week. There has been quite a falling off in business, but the plate makers say it is only temporary. Plate is quoted at 1.80c., and it is likely to be kept at this figure. A good many small orders have been booked within the past few days. Much of this business should have been placed, and would have been placed, several weeks ago, but for labor obstructions.

Structural Material.—No new developments have occurred. No change in prices can be detected. Small buyers for immediate deliveries are glad to get accommodated as promptly as they are accommodated. The American Bridge Company has a great deal of new business in sight, much of which has been presented within 10 days.

Old Rails.—Old steel rails are quoted at $21; old iron rails at $23.50.

Scrap.—Heavy steel scrap is being held in this market at $20, but as buyers are not in urgent need, they only look at it and go about their business. There is some low phosphorus scrap here, but no effort is made to sell it. Choice railroad scrap is being diligently gathered by dealers who are evidently working for some large consumers. Country scrap is also being located and controlled, and the usual quotation is $19; but there is not much selling.

Pittsburg. July 14.

(From Our Special Correspondent.)

While there is but little new business offered the midsummer dullness in the iron and steel markets is not any greater or as great as in former years. The mills in this district, with the exception of a few that are closed for repairs, are busy on old contracts, and the idle mills are getting in shape to resume as rapidly as possible. So far no plant has been forced to close for lack of orders. There is enough business in sight to keep the finishing mills going to October 1, and in some lines until late in the fall. But few of the blast furnaces in the Pittsburg District and the Valleys are idle, but the production is not quite normal on account of the extremely hot weather of the past week. There have been no sales of pig iron lately, and no inquiries have been received for late shipment. Prices are probably a trifle lower than have prevailed, but this is not considered an evidence of weakness. Reports sent out from New York a few days ago of cuts in the prices of pig iron and steel billets were erroneous. It is likely that the Southern furnaces will make a further reduction in foundry iron, but this is not expected to have any effect on the Pittsburg market. One leading steel interest had some bessemer billets to spare about two weeks ago, and sold them at $28, at mill. Since then several lots amounting to about 3,000 tons have sold at $28, Pittsburg. This is not considered a serious cut in prices with steel rails selling at that figure for next year's delivery. It is reported that several sales of bessemer sheet bars have been made at $29, but this lacks confirmation, and the price quoted is $30. Some small lots have sold at $31, and for immediate shipment it is claimed a higher price has been paid. The beam and plate associations met during the week and reaffirmed the prices that have ruled for several years. This practically establishes the prices on all of the principal finished steel products, for the rest of the year, at least.

The activity in tin-plate and merchant pipe continues. In tin-plate the capacity of the mills will be taxed probably until September or October, on account of the unusually heavy demand for canning purposes. All of the American Tin-Plate Company's plants are in full operation, except the 10 mills at New Castle that were damaged by fire a few weeks ago. The independent mills are running better than usual, having lately been able to secure the steel needed. The National Tube Company is filled with business for the summer. Several large orders for 10 and 12-in. pipe for natural gas mains which have been in the market for some time have at last been placed. It is impossible to place orders for large sizes except for delivery late in the year. There has been no further ordering of steel rails for next year. The leading railroad interests have already placed orders for early requiements, and may wait until later in the year before ordering the full tonnage needed.

One threatened strike that would have proved serious, had it occurred, has been averted. The machinists settled the wage scale with the Manufacturers' Association late Saturday night. Some important concessions were granted to the workers. In addition to an advance in wages of 7½ per cent, they will get two additional holidays, New Year's Day and Memorial Day, making six holidays in the year, for which they will receive double time if required to work. The agreement is to remain in force until July 1, 1904, and thereafter, unless either party gives 60 days' notice to the other that they wish to withdraw or change the scale. The settlement affects over 5,000 machinists in the Pittsburg District. The iron molders have not yet settled. At a mass meeting on Friday night the men again voted unanimously to adhere to their original demand for a minimum rate of $3.30 a day instead of $3. They had been offered $3.10. A representative of the men went to national headquarters of the union at Cincinnati yesterday, and if the executive board, which is now in session, grants its approval a strike will be ordered.

Pig Iron.—There is nothing doing in the pig iron market this week. Inquiries are confined to early delivery. Bessemer pig iron is quoted at $18.50, Valley, for July and August, and No. 2 foundry at $18.75, Pittsburg. Gray forge is quiet and probably $18, Pittsburg, can be done.

Steel.—About 3,000 tons of bessemer steel billets have been sold within the past week, the lowest price being $28. Open-hearth billets are quoted at $29. Steel bars and plates are fairly active and the price remains at 1.60c.

Sheets.—The market is considered strong for black and galvanized sheets. The leading interest continues to quote No. 28 gauge black sheets at 2.75c., and galvanized at 3.85c. The price of corrugated roofing sheets is being shaded. Black sheets, that have sold at $2.10 a square, sold this week at $2, and galvanized has declined from $3.45 to $3.35 a square.

Ferro-manganese.—There is no change in price. Domestic 80 per cent is still out of the market, and the foreign product is quoted at $50@$52.50.

St. Louis. July 13.

(From Our Special Correspondent.)

Pig Iron.—In spite of the cut in the price of iron in Southern markets there has been very little buying during the week in review. There are some rumors of further concessions to be made, and it can be judged that iron users of the Mississippi Valley will come into the market when offerings are made at $12, Birmingham, for No. 2. There have been no large sales.

Finished Material.—Both jobbers and mill agents report good business. Shipments have been delayed by poor terminal service, and collections through the South are poor. The revived interest in all lines of tubular goods continues.

New York. July 16.

Pig Iron.—Prices are considerably lower. Concessions are reported on all hands, made to meet the reduction agreed upon by the Southern furnaces. Quotations show a considerable variation, according to brand, buyer, etc. For Northern iron at tidewater prices are: No. 1X foundry, $18.25@$19.25; No. 2X, $17.25@$18.25, while No. 2 plain can be had for 50c. less; gray forge, $16.75@$17.75. For Southern iron, on dock, quotations are: No. 1 foundry, $18.25; No. 2, $17.75; No. 3, $17.25; No. 1 soft, $18.

Cast Iron Pipe.—The pipe foundries are generally busy, and a good many contracts are on the market, both for city use and for near-by towns. Pipe business for this season will probably be the heaviest on record, if present conditions are good indications.

Bar Iron and Steel.—Quotations are unchanged, prices for large lots on dock being as follows: Refined bars, 1.80@1.90c.; soft steel bars, 1.75@1.90c. It is reported that concessions have been offered on one or two large orders for bessemer bars. Trade has been chiefly of a retail order.

Structural Material.—There has been more inquiry on account of the prospective settlement of the building trade strikes. Actual transactions, however, have been light and chiefly of moderate size. For large lots at tidewater, nominal quotations continue 1.75@2c. for beams, angles, channels and tees. The usual advance is asked for small lots out of stock.

Plates.—Plates are still rather quiet, but more inquiry is noted, with some sales of small lots. Prices are unchanged, and sheared plates are quoted as follows: Tank ¼-in. and heavier, 1.80@2c.; flange, 2@2.05c.; marine, 2.10@2.20c.

Pipes and Tubes.—Retail demand is better, and a good deal of business is being done, chiefly in small lots out of store.

Steel Rails.—The quotation remains $28 for standard sections, f.o.b. mills for 1903 delivery; light rails, $33@$36, according to weight. Relaying rails are $28@$30 for heavy sections and $33@$35 for light sections. Demand for rail-fastenings is good.

Cartagena, Spain. June 27.

(Special Report of Barrington & Holt.)

Iron and Manganiferous Ores.—Shipments for the week were one cargo, 1,970 tons dry ore, and one cargo 2,200 tons manganiferous ore, both to Great Britain. Business was restricted during the week, owing to the King's visit, and work has almost been at a stand. The iron ore market is just now a waiting one, and few new orders have been reported. Buyers are holding back, and seem to be using up their stocks. Nevertheless, the mines continue to be fully employed, and a considerable quantity of iron ore is being turned out.

Prices are firm at 6s. 9d.@7s. per ton, f.o.b. shipping port, for ordinary 50 per cent ore; 7s. 3d.@7s. 9d. for special low phosphorus; 9s. 3d. for 58 per cent specular ore. Magnetic ore, 60 per cent iron, is 11s. 6d. for lump and 9s. 6d. for smalls. Manganiferous ores range from 14s. 6d. for 20 per cent manganese and 20 iron, to 9s. 9d. for 12 manganese and 35 iron.

Pyrites.—Iron pyrites, 43 per cent sulphur and 40 per cent iron, are quoted at 10s. 6d. per ton, f.o.b. Cartagena. Shipments for the week were 500 tons to Liverpool, and 510 tons to Port de Bone.

CHEMICALS AND MINERALS.

(See also Prices-Current, page 112.)

New York, July 15.

Briefly, the market is generally very quiet, the few changes in quotations being too unimportant to influence buying.

A surprising feature of the import trade is the apparent want of better judgment on the part of appraisers at the different ports who invariably interpret the tariff schedule so as to impose the highest duty. Where there is doubt, when a decision has been rendered by appraisers, importers appeal to the Treasury Department, and, fortunately, are often vindicated. A word should also be said in behalf of the appraisers who, not being acquainted with the so-called trade names of imported articles, are often perplexed. It would seem advisable hereafter when duty is to be collected on imports to explain the meaning of the trade name and not wait until it becomes necessary to secure expensive expert testimony for a "test case." Of course, many chemicals of industrial importance in this country are unjustly taxed, but in a number of instances argument over a technicality may be avoided if importers would be more careful in making out their manifests. Apropos this subject, it is worthy of mention that importers of ground talc, sometimes called French chalk, are preparing a test case for the Supreme Court to reduce the duty of 1c. per lb. recently imposed by the Government. This duty is an advance of three-quarters of a cent per pound, and puts imported ground talc under paragraph 13 of the tariff, in which are also mentioned all forms of chalk not medicinal or prepared for toilet purposes. The imports of talc into the United States, chiefly from France and Italy last year, amounted to 2,859 short tons, valued at $35,366. While importers are discussing the duty, Southern producers are grasping the opportunity to ask higher prices, believing the duty will stand. Importers, on the other hand, are obliged to add the duty clause in their contracts until the matter has been finally decided.

Cyanide of Potassium.—Authorities abroad are still rather bearish on the situation, and expect continued competition among European manufacturers, whose agreement to regulate prices was broken last December. In the past six months prices have been among the lowest on record. The German, French and British output of potassium cyanide just now is at the rate of 7,600 tons per annum, which is over 71 per cent of the prospective capacity of the plants. In addition about 5,000 tons of sodium cyanide is being produced, making the total prospective capacity of the European works 15,700 tons, while the consumption is estimated at not more than 5,500 tons yearly. The imports of potassium cyanide into the United States are from 1,500 to 1,600 tons per annum. Recently 28 cases were shipped from Great Britain to New Orleans at an average f.o.b. value of a fraction over 18c. per lb. At New York sellers quote on the basis of 20c. per lb., but this price may be shaded on a desirable order.

Bleaching Powder.—In the absence of business, prices are nominally unchanged at $1@$1.12½ per 100 lbs., f.o.b. New York for good imported bleach, and 75c.@$1, f.o.b. works for domestic.

Copper Sulphate.—Makers are at odds, and as business is small, prices are easy. Some sellers ask $4.37½@$4.50 per 100 lbs., f.o.b., while others hold for $4.75. Of course, each tries to uphold his own market price, but consumers are chary and look for more advantageous terms.

Acids.—Commercial acids are moving in a moderate way, though at times sulphuric acid orders are more urgent, owing to the improvement in the soda water trade. Prices continue unchanged.

We quote as below, per 100 lbs., unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity:

Muriatic, 18°....	$1.50	Oxalic, Com'l..	$5.25@$5.50
Muriatic, 20°....	1.60	Sulphuric, 50°,	
Muriatic, 22°....	1.75	bulk, ton ...	13.50@14.50
Nitric, 36°.....	4.37½	Sulphuric, 60°..	1.05
Nitric, 38°.....	4.75	Sulphuric, 60°,	
Nitric, 40°.....	5.00	bulk, ton ...	18.00@20.00
Nitric, 42°.....	5.37½	Sulphuric, 66°,	1.20
		bulk, ton ...	21.00@23.00

Brimstone.—Sellers have changed their tactics as the sulphite pulp mills have been doing a little more buying. Spot best unmixed seconds are quoted at $22.37½@$22.50 per long ton, and shipments at $22.25—prices that leave a good margin on the actual cost of importing. Best thirds are about $1 less than seconds.

Sicilian Brimstone Market.—Messrs. Emil Fog & Sons, of Messina, write us under date of June 30 that there is no improvement in the prostrate position of the market, as the uncertainty of the future discourages speculators and prevents business. The reduction in exports to the United States is evidently owing to the increase to 200 tons daily of the production of the Louisiana mines. Dissidents at Girgenti and Licata have sold a few hundred tons at 1s.@1s. 6d. below market price, but the Anglo-Sicilian Company is inclined to raise prices if possible, and would certainly profit by an opportunity to catch an unfortunate shipper who is uncovered. At Catania prices dropped about 3s., owing to the larger share of dissidents brimstone in the arrivals and the apathy of the Anglo-Sicilian Company to uphold the market, which

they might easily do, especially at the present moment when arrivals have become irregular on account of strikes among the miners. About a month ago the miners of the Trobonella, one of the largest mines in Sicily, knocked off working, which resulted in about one-quarter of the mines stopping. This may reduce the production in the ensuing year. We quote brimstone and refined sulphur as follows, per long ton, f.o.b.: Best unmixed seconds, in bulk, 81s. 9d.; best seconds ground, 87s. 6d.; best thirds, 79s.; current thirds, 77s. 9d.; refined block, 85s. 9d., in bulk, and 88s. 3d. in bags; roll, 92s.@97s. 3d., according to package, and 101s. 9d.@103s. 9d. in sticks; sublimed flowers, pure, in bags, 104s.; current, 97s.; commercial, 92s. 3d. Freight rates have not improved. To New York, 7s.; Baltimore and Philadelphia, 8s.; Boston, 7s. 6d.; Portland, 7s. 6d.; Canadian ports, 8s. 6d.; San Francisco, 25-ton minimum, 27s.

Pyrites.—Imports are more frequent, and this week 3,108 tons iron pyrites have come to New York from Pilleys Island, Newfoundland. At one time it was thought the Pilleys Island deposits were worked out, but since Americans became interested shipments have been resumed. Prices for both domestic and foreign pyrites vary little as deliveries are being made on long-time contracts.

We quote: Domestic pyrites, $5 per ton for lump ore, f.o.b. Atlantic coast mines, and 10c. per unit for fines; sulphur content varies from 42@44 per cent. Spanish pyrites, carrying from 46@52 per cent sulphur, are quoted at 11@12c. per unit for lump and 10@10½c. for fines, delivered at Atlantic ports.

Nitrate of Soda.—The market is a little more active, and prices are firm in all positions, owing to a higher coast market. Spot is quoted at $2.05 per 100 lbs., and futures, $2. Ocean freights continue strong, as the amount of disengaged tonnage is small, and with the approach of the European shipping season nitrate of soda is likely to go higher.

Chilean Nitrate of Soda Market.—Messrs. Jackson Brothers, of Valparaiso, write us under date of May 30, as follows: We have again had a quiet fortnight, as most producers have not been ready sellers. A few parcels of 95 per cent have changed hands for May-June at 6s. 4d.@6s. 4½d.; July-December, 6s. 6d.; December, 6s. 5½d.@6s. 6d., and January, 6s. 5d.; and in the refined quality for July-September, 6s. 8½d.; December-January, 6s. 8d., all alongside terms. We quote: 95 per cent, May-June, 6s. 4½d.; July, 6s. 5d.; August-December, 6s. 6d.; and 96 per cent, 1 per cent, June-December, 6s. 9d., all ordinary terms sellers. The price of 6s. 4½d., with an all-round freight of 20s. stands in 8s. 1d. per cwt., net cost and freight, without purchasing commission.

Sulphate of Ammonia.—Good gas liquor is in better request, and holders ask $3.15@$3.17½ per 100 lbs., according to position. Completed figures have just been received, showing the production of sulphate of ammonia in Great Britain last year, as given below:

	1901.	1902.	Changes.
Gas works	142,703	150,055	I. 7,352
Iron works	16,353	18,801	I. 2,448
Shale works	40,011	36,931	D. 3,080
Coke ovens	12,255	15,352	I. 3,097
Producer gas and carbonizing works	5,891	8,177	I. 2,286
Total, long tons	217,213	229,316	I. 12,103

The increase in the production last year is equivalent to about 6 per cent, attributed chiefly to the gas works of which there are 705. It is expected that there will be continued growth also in the recovery of sulphate from producer gas with the development of central stations for supplying power gas.

Phosphates.—June shipments of Florida high-grade rock were somewhat less than last year, but prices appear to have been more satisfactory to exporters. In June, Savannah shipped 6,884 long tons high-grade Florida rock, making 79,073 tons for the half-year, which is 4,686 less than was reported in the corresponding period of 1902. Germany was the principal buyer.

Tennessee and South Carolina rock, and Florida pebble, are all enjoying a fairly good business, and like the Florida high-grade rock miners are holding for higher prices.

A charter was taken this week from Tampa to Nantes, France, at 14s. 6d. ($3.48), August sailing.

Phosphates	Per ton F. o. b.	United Kingdom or European Ports. Unit.	Long ton.
*Fla. hard rock (77@80%)	$7.00@$7.50	7¼@7¾d.	$11.31@12.09
*Fla. land peb. (68@73%)	3.50@ 3.75	5½@5¾d.	7.70@ 8.05
†Tenn., (78@82%) export	4.00@ 4.25	6½@7d.	10.40@11.20
†Tenn., 78% domestic	3.75@ 4.00	.....	.....
†Tenn., 75% domestic	3.50	.....	.....
†Tenn., 73@74% domestic	2.95@ 3.20	.....	.....
†Tenn., 70@72% domestic	2.70@ 2.95	.....	.....
‡So. Car. land rock	....@ 3.25	.....	.....
‡S. Car. riv. r'k (85@66%)	2.75@ 3.00	5½@5⅝d.	5.95@ 6.53
Algerian (63@70%)	.....	5½@6¼d.	7.37@ 8.38
Algerian (58@63%)	.....	5¼@6d.	6.30@ 7.20
Gafsa (Tunis)	.....	5¼@6d.	6.30@ 7.20
Christmas Isl. (80@85%)	.....	7¼@7¾d.	12.04@12.87

* Fernandina, Tampa, Brunswick, Savannah or Port Inglis.
† Mt. Pleasant. ‡ On vessels, Ashley River.

METAL MARKET.

New York, July 16.

Gold and Silver Exports and Imports.

At all United States Ports in June and Year.

Metal	June. 1902.	June. 1903.	Year. 1902.	Year. 1903.
Gold:				
Exports	$391,525	$12,507,588	$20,276,237	$31,327,483
Imports	4,086,457	4,767,553	13,187,344	15,368,199
Excess.	E. $3,394,932	E. $7,740,035	E. $7,088,893	E. $15,959,284
Silver:				
Exports	$3,250,066	$1,551,410	$22,528,034	$17,426,973
Imports	1,802,853	2,050,805	12,220,738	10,340,798
Excess.	E. $1,447,213	E. $499,395	E. $10,307,296	E. $7,086,175

These exports and imports cover the totals from all United States ports. The figures are furnished by the Bureau of Statistics of the Treasury Department.

Gold and Silver Exports and Imports, New York.

For the week ending July 15, and for years from January 1:

Period.	Gold. Exports.	Gold. Imports.	Silver. Exports.	Silver. Imports.	Total Excess, Exports or Imports.
Week	$5,079,025	$23,123	$327 100	$279	E. $5,382,723
1903	31,811,481	3,561,944	10,424,956	1,167 767	E. 37,506,726
1902	16,538,232	1,316,4 2	14 318,260	733,154	E. 28.806,866
1901	25,774.704	1,523 376	18,354,887	2,125,456	E. 40,480,759

The gold exported this week went principally to France and Germany; the silver to London. The gold and silver imports were chiefly from Havana and Colon. To the year's totals of gold and silver exports are added shipments too late for the preceeding week's report.

Financial Notes of the Week.

General business is good for the season. The strain of the liquidation in Wall Street, which is still going on, is felt to some extent. The fall in stocks, however, is really putting matters on a better basis. Some gold is going out still, about $2,500,000 having been taken for export since the middle of last week.

The statement of the New York banks, including the 56 banks represented in the Clearing House, for the week ending July 10, gives the following totals, comparisons being made with the corresponding weeks of 1902 and 1901:

	1901.	1902.	1903.
Loans and discounts	$868,465,400	$906,776,200	$909,529,000
Deposits	947,594,100	942,198,000	892,143,300
Circulation	30,629,500	31,777,200	43,910,200
Specie	172,312,700	170,507,200	156,673,100
Legal tenders	77,395,200	77,269,200	74,371,200
Total reserve	$249,707,900	$247,776,400	$231,044,300
Legal requirements	236,898,525	235,549,500	223,035,825
Balance surplus	$12,809,375	$12,226,900	$8,008,475

Changes for the week, this year, were an increase of $1,100 in circulation, and decreases of $7,915,200 in loans and discounts, $11,749,600 in deposits, $2,629,200 in specie, $677,400 in legal tenders, and $369,200 in surplus reserve.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison made with the holdings at the corresponding date last year:

	1902. Gold.	1902. Silver.	1903. Gold.	1903. Silver.
N. Y. Ass'd.	$170,507,200	.....	$156,673,100	.....
England	188,449,010	.....	183,579,040	.....
France	512,244.370	$224,071,015	502,586,115	$224.872,235
Germany	181,030,000	66,995,000	163,850,000	57,570,000
Spain	70,855,000	98,385,000	72,800,000	103,640,000
Neth'l'ds	24.248.000	33,662,500	19,703,000	33,261,000
Belgium	16.333,335	8,166,665	14,803,335	7,401,665
Italy	80,935,000	10,314,500	92,560,000	11,325,000
Russia	374,145.000	44,260,000	392,780,000	44,925,000

The returns of the Associated Banks of New York are of date July 10, and the others July 9, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

India has been in the silver market for the last few days, and has bought more freely. The price consequently has risen. Heavy selling at 24⅝@24¾d. has satisfied the demand, and the market closes to-day quiet and easy.

The United States Assay Office in New York reports receipts of 30,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to July 2 are reported by Messrs. Pixley & Abell's circular, as follows:

	1902.	1903.	Changes.
India	£3,605,545	£3,244,525	D. £361,020
China	63,440	220,918	I. 157,478
The Straits	70,550	364,579	I. 294,029
Total	£3,739,535	£3,830,022	I. £90,487

Arrivals for the week, this year, were £134,000 in bar silver from New York, and £6,000 from Australia; total, £140,000. Shipments were £9,000 in bar silver to Bombay, £38,500 to Singapore, £15,075 to Hong Kong, and £2,500 to Madras; total, £65,075.

Indian exchange has been somewhat weaker, owing to the abundance of money in the Indian banks. The Council, however, refused to sell any bills for less than 16d. flat, and all the bills offered were taken in London at that price.

Exports of merchandise from the United States in June were valued by the Bureau of Statistics of the Treasury Department at $95,076,457; being $5,853,134 less than in May, but $5,835,974 more than in June, 1902. For the full fiscal year ending June 30, the statement is as follows:

	1902.	1903.
Exports	$1.381,719.401	$1,419,991,290
Imports	903,320,948	1,025,619,127
Excess, exports	$478,398,453	$394.372,163
Add excess of exports, silver		20,081,768
Add excess of exports, gold		108,568
Total apparent balance		$414,562,499

The gold and silver movement will be found in the usual place, at the hea dof this column.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	$0.42½	$0.44
Peruvian soles and Chilean pesos	.39	.42
Victoria sovereigns	4.86	4.88
Twenty francs	3.86	4.88
Twenty marks	4.76	4.80
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

July	Sterling Exchange	Silver N. Y. Cts.	Copper London, Pence.	Copper Lake, Cts. per lb.	Copper Electrolytic, Cts. per lb.	Copper London, £ per ton.	Tin, Cts per lb.	Lead Cts. per lb.	Spelter N. Y. Cts. per lb.	Spelter S. L., Cts. per lb.
				13⅛	13¼			4.05		
9	4.87¼	53	24 1/16	@13⅜	@13½	56¾	27⅛	@4.10	5.65	5.50
				13⅛	13¼			4.05		
10	4.87½	53	24 1/16	@13¼	@13½	56½	27¼	@4.10	5.65	5.50
				13⅛	13¼			4.05		
11	4.87½	53½	24½	@13¼	@13½	....	27⅜	@4.10	5.65	5.50
				13⅜	13½			4.05	5.65	5.50
13	4.87½	53½	24½	@13⅜	@13½	56¼	27⅝	@4.10	@5.70	@5.55
				13⅜	13¾			4.05	5.65	5.50
14	4.87	53¾	24¾	@13⅜	@13⅜	56½	27½	@4.10	@5.70	@5.55
				13¾	13½			4.05	5.65	5.50
15	4.86¾	53¾	24¾	@13¾	@13⅜	56½	27¼	@4.10	@5.70	@5.55

London quotations are per Long Ton (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars; the price of electrolytic cathodes is usually 0.25c lower than these figures

Copper.—During the week under review our market has been unfavorably influenced by the continued flatness of the Stock Exchange. Consumers are again prcoeeding very cautiously, while producers are more inclined to take orders at current values. There has been a good inquiry from Europe. At the close we quote Lake Copper at 13⅜@13⅝c.; electrolytic in ingots, cakes and wirebars at 13⅛@13⅜c.; in cathodes at 12⅞@13⅛c.; casting copper at 12¾@12⅞c.

The market for standard copper in London, which closed last week at £56 12s. 6d., opened on Monday at £56 5s., and the closing quotations on Wednesday are cabled as £56 10s.@£56 12s. 6d. for spot, £56@£56 2s. 6d. for three months.

Refined and manufactured sorts we quote: English tough, £60 10s.@£61; best selected, £61 10s.@£62; strong sheets, £70@£70 10s.; India sheets, £67@£67 10s.; yellow metal, 6¼@6⅝d.

Exports and imports of copper at New York, Philadelphia and Baltimore in the week of July 14, and for the year to date were, in long tons:

	Week.	Year.
Exports:		
Austria	....	2,927
Belgium	18	847
France	....	11,698
Germany	332	13,201
Holland	955	20,737
Italy	....	1,452
United Kingdom	312	9,004
Other countries	123	3,377
Total copper	1,740	63,243
Matte	75	286
Imports:		
Copper	881	14,183
Matte	....	984
Ore	2,306	11,150

The movement has been better than last week. Of the imports 500 tons copper came from Chile, and 116 tons from Japan. The ore received was from Tilt Cove.

Imports and exports of copper in Germany, for the five months ending May 31, were as follows, in metric tons:

	1902.	1903.	Changes.
Imports	32,363	34,209	I. 1,846
Exports	1,837	2,202	I. 365
Balance	30,526	32,007	I. 1,481

Imports of copper ore were 2,651 tons, against 1,621 tons last year. On the other hand, exports of copper ore were 7,164 tons, against 7,022 tons last year.

Tin has been quite active, and a fair business has been done. The closing quotations are 27¼c. for spot, 27c. for futures.

The foreign market, which closed last week at £123, opened on Monday at £124 5s., advanced on Tuesday to £125, and the closing quotations on Wednesday are cabled as £123 5s.@£123 7s. 6d. for spot, £120 10s.@£120 12s. 6d. for three months.

Lead has again been in very good demand. The closing quotations are 4@4.02½c., St. Louis; 4.05@4.10c., New York.

The foreign market is rather irregular, Spanish lead being quoted at £11 8s. 9d.@£11 11s. 3d.; English lead, 2s. 6d. higher.

Imports of lead into Germany, for the five months ending May 31, were 19,326 metric tons, an increase of 3,885 tons oevr last year.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is strong for both prompt and future delivery. Missouri brands are selling at 4.05@4.07c., East St. Louis. Desilverized lead is scarce and nominal.

Spanish Lead Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of June 27, that the price of silver during the week was 13.25 reales per ounce. Exchange remained unaltered at 34.35 pesetas to £1. Local quotation for pig lead was 61.75 reales per quintal, which, on current exchange, is equal to £10 1s. 2d. per ton of 2,240 lbs., f.o.b. Cartagena. Shipments for the week were 343,334 kgs. pig lead to Marseilles, and 250 kgs. soft lead to Hamburg.

Spelter.—There has been a very good inquiry throughout the week, and spot metal is again beginning to get rather scarce. At the close we quote 5.50@5.55c., St. Louis; 5.65@5.70c., New York.

The foreign market is somewhat firmer, good ordinaries being quoted at £23 15s.; specials at £24.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: Spelter is quiet. Spot and July metal is quiet at 5.50c., East St. Louis, while August deliveries are nominal at 5.45c.

Silesian Spelter Market.—Herr Paul Speier writes from Breslau, Germany, under date of June 30, that during the month there was little speculation in the market, while consumers were only moderate buyers. The course of the metal in the larger markets has been downward. A large quantity was at the same time offered from second hands. Quotations were 20 to 20.75 marks for 50 kg., f.o.b. cars Breslau. This is equal to 4.42c. per lb. The heaviest exports in May were to Austria and Great Britain. Zinc dust was quiet, with little change in prices. Exports from Germany for the five months ending May 31 included 26,100 metric tons spelter; 48,796 tons zinc sheets; 1,508 tons scrap; 7,251 tons zinc-white; 3,605 tons lithophone and 17,859 tons zinc ore. Imports included 8,565 tons spelter; 51 tons zinc sheets; 700 tons scrap; 1,379 tons zinc-white and 24,998 tons zinc ore.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of June 27, that the steady fall in price has had a depressing effect upon the local ore market, and several of the principal mines have stopped shipping for the present. Exports for the week were 753 tons of blende to Antwerp.

Antimony is dull. We quote: Cookson's at 7½c.; Hallett's, 6½c.; Hungarian, Japanese, United States, Italian and French at 6¼@6⅜c.

Nickel.—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per lb.

Platinum.—Consumption continues good, and prices are firm. Ingot platinum in large lots brings $19 per oz. in New York.

Quicksilver.—The New York price is unchanged at $47.50 per flask for large lots, with a slightly higher figure quoted for small orders. The San Francisco quotations are still $44.50@$46 per flask for domestic orders, and $42@$43 for export. The London price is £8 12s. per flask, with the same quotation asked by second hands.

Minor Metals and Alloys.—Wholesale prices, f.o.b. works, are as follows:

Aluminum.	Per lb.
No. 1 99% ingots	33@37c.
No. 2 90% ingots	31@34c.
Rolled Sheets	4c. up
Alum-bronze	20@23c.
Nickel-alum	33@39c.
Bismuth	$2.10
Chromium, pure (N.Y.)	80c.
Copper, red oxide	50c.
Ferro-Molyb'um (50%)	$1.25
Ferro-Titanium (10%)	90c.
Ferro-Titanium (20@25% N. Y.)	55c.
Ferro-Tungsten (37%)	28c.
Magnesium	$2.75
Manganese, pure (N. Y.)	60c.
Mangan'e Cop. (20% Mn)	32c.
Mangan'e Cop. (30% Mn)	38c.
Molybdenum (Best)	$1.82
Phosphorus foreign	45c.
Phosphorus American	70c.
Sodium metal	50c.
Tungsten (Best)	62c.

Variation in prices depends on size of orders, deliveries, etc.

Missouri Zinc Ore Market. July 11.

(From Our Special Correspondent.)

Market prices continued throughout the week unchanged, with the highest price at $40 per ton, and the assay basis from $35 to $37.50 per ton. In view of the increase of 1,155 tons in the shipment over the Fourth-of-July week, it is quite aparent that the need of zinc is strong enough to take up all that can be outputted. In fact, a smelterman informed your correspondent recently that the smelters would be glad to receive 6,000 tons per week from the Joplin District, the balance of 1903, if the output could be forced to that limit. As the gentleman is one of the largest owners of mineral lands in this district it will be seen that he was not speaking alone from the observations of a smelterman. It is nuderstood that the Lanyon Zinc Company and the Prime Western Zinc Company, of Iola, are laying in a large supply of Western ore. The Lanyon Company now maintains a buyer regularly in the West, while the Prime Western Company secures its supplies through the Empire Zinc Company, of Canyon City, Colo., both the Prime Western and Empire companies being controlled by the New Jersey Zinc Company. The Empire Company has large wet and dry concentration works at Canyon City for the treatment of Colorado zinc ore, preparing it for the smelter. The dry process is the Wetherill electro-magnetic separation to remove the iron. It is understood heer that the Prime Western is now smelting almost as much Western ore as ore from the Joplin District, while the Lanyon Company is said to be using about one-third Western ore. The fear of ore from other districts affecting the situation in this district has long since been swept away in the knowledge that the smelters prefer these ores, and with all things equal will purchase the Joplin ore in preference. The consumption of Western zinc by the gas smelters in Kansas is placed at 800 to 1,000 tons per week. Information from Wisconsin is to the effect that this field will soon be outputting approximately 1,000 tons per week. The Ozark Oxide Company, of Joplin, is getting mixed sulphide and carbonate ore from Arkansas regularly, and there is an occasional car-load secured by some smelter as a test. The Edgar Zinc Company has, perhaps, handled more of the Arkansas product than any other smeltermen.

The output of the Joplin District for the week was 5,204 tons, an average of 867 tons per day for six days, while the output for the previous week was an average of 807 tons per week of five days, a difference of 60 tons per day. It is unlikely that this increase can be maintained steadily, but it is certain that though it may fluctuate up and down for a few more weeks, two months more will see the output regularly in excess of 5,200 tons per week. Nearly all the mines are now unwatered, including some that have been idle since last year, and there is an increasing demand for miners. With the passing of the wet season, new mines are being developed, that will add materially to the output by fall, and, looking at the situation from every point of view, the outlook is favorable that the latter half of the year will make up the deficiency of the first half, and may even place this year's tonnage as far ahead of last year s it is now in point of vlues.

Following re the sales of zinc and lead ore from the various camps of the Joplin District for the week ending to-day:

	Zinc, lb.	Lead, lb.	Total value.
Joplin	3,859,900	376,840	$81,507
Webb City & Carterville	1,799,500	448,060	34,144
Galena and Empire	1,182,020	76,090	22,643
Duenweg	414,710	126,890	10,961
Alba and Neck	508,720	.....	9,411
Zincite	403,540	.....	7,263
Aurora	415,820	11,690	7,000
Prosperity	310,330	22,010	6,313
Mitchell	307,700	18,440	6,018
Oronogo	356,230	1,540	5,781
Granby	271,000	41,000	4,690
Carl Junction	198,880	.....	3,679
Carthage	102,110	.....	1,940
Cave Springs	59,270	17,470	1,553
Spurgeon & Spring City	66,760	27,740	1,455
Central City	77,430	.....	1,240
Wentworth	73,560	.....	1,030
Springfield	.....	44,000	1,100
Ash Grove	.....	32,100	803
Total sales, the week	10,407,480	1,243,870	$208,531
Total, 28 weeks	263,194,450	31,104,220	$5,327,821

Zinc value, the week, $176,594; lead value, the week, $31,937.
Zinc value, 28 weeks, $4,486,374; lead value, $841,447.

Average Prices of Metals per lb., New York.

Month.	Tin. 1903.	Tin. 1902.	Lead. 1903.	Lead. 1902.	Spelter. 1903.	Spelter. 1902.
January	28.33	23.54	4.075	4.000	4.865	4.27
February	29.43	24.07	4.075	4.075	5.043	4.15
March	30.15	26.32	4.442	4.075	5.349	4.28
April	29.81	27.77	4.567	4.075	5.550	4.37
May	29.51	29.85	4.325	4.075	5.639	4.47
June	28.34	29.36	4.210	4.075	5.697	4.96
July	....	28.38	....	4.075	....	5.27
August	....	28.23	....	4.075	....	5.44
September	....	26.60	....	4.075	....	5.49
October	....	26.07	....	4.075	....	5.33
November	....	25.68	....	4.075	....	5.13
December	....	25.68	....	4.075	....	4.78
Year	....	26.79	....	4.069	....	4.84

Note.—The average price of spelter in St. Louis for the month of January, 1903, was 4.689c. per lb.: for February, 4.861c.: for March, 5.174c.: for April, 5.375c.: for May, 5.469c.: for June, 5.537c.

Average Prices of Copper.

Month.	New York Electrolytic. 1903.	New York Electrolytic. 1902.	Lake. 1903.	Lake. 1902.	London Standard. 1903.	London Standard. 1902.
January	12.159	11.053	12.361	11.322	53.52	48.42
February	12.778	12.173	12.901	12.378	57.34	55.16
March	14.416	11.882	14.572	12.188	63.85	53.30
April	14.454	11.618	14.642	11.986	61.72	52.79
May	14.435	11.856	14.618	12.226	61.73	54.03
June	13.942	12.110	14.212	12.360	57.30	53.93
July	.....	11.771	.....	11.923	....	52.89
August	.....	11.404	.....	11.649	....	51.96
September	.....	11.480	.....	11.760	....	52.68
October	.....	11.449	.....	11.722	....	52.18
November	.....	11.288	.....	11.533	....	51.66
December	.....	11.430	.....	11.599	....	50.95
Year	.....	11.626	.....	11.887	....	52.46

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Month.	1903. London. Pence.	1903. N. Y. Cents.	1902. London. Pence.	1902. N. Y. Cents.	1901. London. Pence.	1901. N. Y. Cents.
January	21.98	47.57	25.62	55.56	28.97	62.82
February	22.11	47.89	25.41	55.09	28.13	61.06
March	22.49	48.72	25.00	54.23	27.04	60.63
April	23.38	50.56	24.34	52.72	27.30	59.29
May	24.89	54.11	23.71	51.31	27.43	59.64
June	24.29	52.86	24.17	52.36	27.42	59.57
July	....	....	24.38	52.88	26.96	58.46
August	....	....	24.23	52.52	26.94	58.37
September	....	....	23.88	51.52	26.95	58.26
October	....	....	23.40	50.57	26.62	57.59
November	....	....	22.70	49.07	26.12	56.64
December	....	....	22.21	48.03	25.46	55.10
Year	....	....	24.09	52.16	27.11	58.95

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Name of Company.	Date.	Per Share.	Total.	Total to Date.
†American Cement	July 21	.30	$60,000	$620,000
American Cement, extra	July 21	.10	20,000	.....
Camp Bird, Colo.	July 28	.36	295,200	750,300
*Daly West, Utah	July 15	.60	108,000	3,015,000
Gold King, Colo.	July 20	.03	28,105	459,056
†Mary McKinney, Colo.	July 10	.03	30,000	.....
†Phila. Nat. Gas, com.	Aug. 1	.75	231,406	3,185,425
†Pittsburg Coal, pf.	July 25	1.75	519,771	7,796,565
†Portland, Colo.	July 15	.03	90,000	4,567,080
Tenn. Copper	July 30	1.25	218,750	218,750
†U. S. Steel, com.	Sept. 9	1.00	5,083,025	50,809,577
†U. S. Steel, pf.	Aug. 15	1.75	8,929,919	89,262,829
Utah Con.	July 23	1.50	450,000	1,686,000

* Monthly. † Quarterly.

ASSESSMENTS.

Name of Company.	Location. No.	Delinq.	Sale.	Amt.
Annandale	Utah ..	July 15	Aug. 8	.00½
Best & Belcher	Nev. ..	July 17	Aug. 7	.15
Caledonia	Nev. 54	July 8	July 24	.15
Chicago & Bingham	Utah ..	July 17	Aug. 6	.00¼
Christmas	Utah ..	July 14	Aug. 8	.00½
Con. New York	Nev. 18	July 15	Aug. 5	10
Eutonia	Utah ..	July 13	Aug. 3	.00½
Free Silver	Utah ..	July 10	Aug. 10	.00¼
Lucky Bill	Utah ..	July 25	.....	.07½
Marina Marsicano	Cal. ..	Aug. 1	.....	.10
Martha Washington	Utah ..	July 28	Aug. 8	.01½
Mohave	Utah ..	July 13	Aug. 3	.01
New Pass	Nev. ..	July 25	.....	.04
New State	Utah 5	July 20	Aug. 20	.02½
Seg. Belcher & Midas	Nev. 32	July 29	Aug. 18	.05
Skylark Copper	Utah ..	July 24	Aug. 10	.00½
Spider	Utah ..	Aug. 12	Sept. 1	.00¼
Tetro	Utah 26	July 25	Aug. 22	.02
Utah Con.	Nev. ..	July 17	Aug. 7	10

STOCK QUOTATIONS

NEW YORK.

Company and Location.	par val	July 8. H.	July 8. L.	July 9. H.	July 9. L.	July 10. H.	July 10. L.	July 11. H.	July 11. L.	July 13. H.	July 13. L.	July 14. H.	July 14. L.	Sales
Adams, Colo.	10			.10										100
Amalgamated c., Mont	100	53⅜	53¼	53¾	52⅝	52⅛	51¼	52	50	50⅞	48¾	50¼	49	185485
†Anaconda c. Mont.	25	86¾		86¾		84	82	81	80⅛	82⅛	80⅛	81⅜		4,840
Anaconda Gold, Colo.	5													
Andes, Nev.	1											.00		300
Belcher, Nev.	3	.50												550
Best & Belcher, Nev	3													
Caledonia, Nev.	2½													
Chollar, Nev.	3													
*Confidence, Nev.	3			1.25										200
Con. Cal. & Va., g. s. Nev	2½	1.45		1.45		1.40		1.40	1.35			1.35		1,503
Cons. Imperial, Colo.	1													
C. K. & N., Colo.	1													
Cripple Creek c., Colo.	1					.03½								500
Elkton g., Colo.	1			.43		.48	.47					.48		900
Golden Fleece, Colo.	1											.08		500
Greene Con., c., Mex.	10	22¼	22⅛			21	20½	20½	20¼	20¾	20	21	20½	9,520
Hale & Norcross	3	.69	.68	.68				.65						500
Horn Silver, Utah	25					1.15								200
Isabella, g., Colo.	1	.13⅛	.12	.11	.10½	.11⅛						.10½		2,900
Jack Pot, Colo.	1					.10		.10						1,500
Justice, Nev.	1					.16		.16						2,000
Leadville, Colo.	10													
Mexican, Nev.	3													
Mollie Gibson, Colo.	5							.05						1,000
Moon-Anchor, Colo	5													
Occidental, Nev.	1													
Ontario, Utah	100													
Ophir, s., Nev	1			1.60				1.55				1.55		500
Pharmacist, Colo.	1			.03								.03		1,000
Phœnix, Ariz.	1													
Portland, Colo	10	1.33						1.30						500
Potosi, Nev.	3			.30	.29									200
Savage, Nev.	2			.22	.21									300
Sierra Nevada, Nev	3			.65										300
Silver Hill, Nev	1	.99												100
Small Hopes, Colo.	20													
Standard, Cal.	10			3.00								3.00		125
Tenn. c., Tenn	25													
Union Con., Nev.	2½											.85		100
Union Cop., N. C.	10	1⅛	1¼	1⅜		1¼			1⅛	1		1¼	1⅛	6,700
United Copper	100	18½	18⅜	18¼	16¾	18¼	18⅜	18¼	19¼	18⅛		18¼	18	1,355
Vindicator, Colo.	1													
White Knob, g. s., Ida	100			13								12½		410
Yellow Jacket, Nev.	3	.74		.73										200

*Holiday. Total sales 223,718 shares.

BOSTON, MASS.*

Name of Company.	par val	Shares listed.	July 8 H.	July 8 L.	July 9. H.	July 9. L.	July 10. H.	July 10. L.	July 11. H.	July 11. L.	July 13. H.	July 13. L.	July 14. H.	July 14. L.	Sales
Adventure Con., c.	$25	100,000	4¾	4¼	4¾	4	4½		4		4 1/16	4	4 1/16	4	1,100
Allouez	25	99,511	5⅞	5¾	5¾		5⅞	5¾			5½	5	5¼	5⅛	2,097
Amalgamated, c.	100	1,538,879	53¾	53¼	53½	52⅛	52⅜	51⅜	52	50	50¾	48¾	51	49	27,067
Am. Gold Dreding	5	80,000													
Am. Z. L. & Sm.	25	60,000													
Anaconda	25	1,200,000									20⅛		20⅛		60
Arcadian, c.	25	150,000			2⅜	2¼	2¼		2¼	2	2		2⅛	2	765
Arnold	25	60,000					.25								50
Atlantic, c.	25	100,000	9⅛		9⅛						9⅜		9¼		175
Bingham Con., g. s.	50	150,000	26		25⅞	24¾			25	24⅛	25	24	24	23½	1,917
Bonanza	10	300,000							.60		.55	.50	.55		400
Cal. & Hecla, c.	25	100,000	450	445	445	440	445	440	445		440	425	425		113
Centennial, c.	25	90,000	49		16¾	16	17¾	17½	17⅝	17	17½	16¾	17½	16⅜	1,779
Con. Mercur, g.	5	1,000,000	1⅛						1⅛	1⅜			1⅛		785
Central Oil	25	60,000													
Copper Range Con.	100	285,000	53⅛	53	53¼	52½	52	51⅝	51⅜	51⅛	51¼	48⅞	50	48½	8,384
Daly-West., g. s.	20	180,000	42¼	42	42	41½	40½		41	39⅜	38½	37½	38¼		1,265
Dominion Coal	100	150,000	107	104½	108¾	103¾	103	100	100	99	100	96	100	98½	9,030
Dominion Coal, pf.	100	30,000			114										10
Dominion I & S.	100	100,000	21	20¼	20¼	16½	16¼	14⅝	15½	15	15	14	15	14¼	7,395
Elm River	12	100,000	2⅜		2⅜	2¾			2⅜		2¾	2½			620
Franklin, c.	25	100,000	9		8¾	8½	8½				8	8	8 1/16		285
Granby	10	1,336,303					4¼	4⅛			4	4			1,100
Guanajuato, Con.	5	385,000									1	1	1		3,150
Isle Royale Con., c.	25	385,000	8				7⅛		7		7		6⅞	5⅛	1,215
Mass Con., c.	25	100,000	6		6		6⅛	6			5⅛		5⅜	5⅛	360
Mayflower, c.	25	100,000									1⅛	1 1/16			175
Michigan, c.	25	100,000	8¼	8			8¼	8⅛	8⅜	8¼	8		8⅜		510
Mohawk, c.	25	100,000	43⅜		44½	43½	43	41⅜	42		41	37⅝	40	38¼	1,769
Mont. Coal & Coke	25	200,000			1¼	1							4¼		100
Mont'l & Boston, c.	5	570,000					1	1					1	75	540
Nova Scotia St. & C.	100						96	95			94	90			170
Nova Scotia St. & C. pf	100														
Old Colony, c.	25	100,000	1.00	.85							.85		.85		300
Old Dominion, c.	25	150,000	13½	13¼	13⅜	13	13	12⅜			12	11⅜	12	11⅜	1,120
Osceola, c.	25	98,150	56⅜	56⅛	56	55½	54¼	54	54		53	50¼			528
Parrot, s. c.	10	229,850	21¼		21⅛	21	20⅛	20¼	20		20	19¾	19½	19	404
Phoenix Con., c.	25	100,000	4⅛								4¾	4			170
Quincy, c.	25	100,000			97	96	97		97		98				65
Rhode Island, c.	25	100,000			1¾						1⅜				150
Santa Fe, g. c.	10	250,000							1⅛						100
Shannon, c.	10	188,153	11		11		10½	10¼	10½		10¼		10		1,147
Tamarack, c.	25	60,000	105	100	105	102	100				97	90	95	90	508
Tennessee	25	176,000													
Trimountain	25	100,000	87		87	85	85	84			84		84		278
Trinity, c.	25	180,000	5⅜		5½	5¼			5⅛	5	5¼	5	5	4¾	1,579
United Copper	100	450,000	18								50				35
United States, g.	25	419,000	21¼		21⅜	21			20⅜		20¼	19⅞	20	19	4,537
U. S. Coal & Oil	25	240,000	12				11¾	11⅛	11½		11⅜		11⅜	11¼	675
Utah Con., g.	5	300,000	29¼	28⅜	29	28⅜	28⅛		27	26⅛	26⅜	25⅜	27	28⅜	5,056
Victoria, c.	25	100,000	4¾	4					4⅛	4	4	3⅛			715
Winona, c.	25	100,000	8½	8⅜	8¾	8½	8½		8		8	7¼	7⅝		1,380
Wolverine, c.	25	60,000	67		66				66		85	64	65		207
Wyandot	25	100,000													

* Boston Stock Exchange. † Ex Dividend. ‡ Assessment Paid. § Holiday. Total sales, 91,330 shares.

SAN FRANCISCO.*

Name of Company.	Location.	Capitalization.	July 3.† H.	July 3.† L.	July 4.† H.	July 4.† L.	July 6.† H.	July 6.† L.	July 7.† H.	July 7.† L.	July 8. H.	July 8. L.	July 9. H.	July 9. L.	Sales.
Central Eureka	Cal.	$400,000									.88		‡		1,000
Colehan	Nev.	1,000,000													
Draper	Cal.	500,000									.10				1,000
Esperanza	Nev.	1,000,000							.05		.05		.06	.05	1,650
Gipsy Queen	Nev.	750,000													
Golconda	Ore.	3,000,000									.18		.18		1,000
Lucky Tom	Nev.	1,000,000													
MacNamara	Nev.	500,000									.30				50
Mont. Tonopah	Nev.	1,000,000							1.00		1.00		.98		450
New York Tonopah	Nev.	1,000,000											12		100
Paymaster	Nev.	750,000							.22		.21	.20	.19		700
Rescue	Nev.	500,000							.15	.14	.15		.15		5,050
South Eureka	Cal.	300,000													
Tonopah-Belmont	Nev.	2,000,000							2 17½						1,650
Tonopah & Cal	Nev.	2,000,000											.22		6,840
Tonopah Fraction	Nev.	750,000													
Tonopah Midway	Nev.	1,000,000							.48		.52	.50	.50		2,050
Tonopah North Star	Nev.	750,000							.47		.48	.46	.47	.45	1,850
Tonopah Union	Nev.	750,000							1.40						100
United Tonopah	Nev.								.20				.16		2,000

* San Francisco & Tonopah Mining Exchange. Total sales, 25,500 shares. † Holiday. ‡ Ex-Dividend. Board adjourned Wednesday, July 1st, till Tuesday, July 7th.

COAL, IRON AND INDUSTRIAL STOCKS.*

Name of Company.	Par val	July 8. H.	July 8. L.	July 9. H.	July 9. L.	July 10. H.	July 10. L.	July 11. H.	July 11. L.	July 13. H.	July 13. L.	July 14. H.	July 14. L.	Sales
Allis-Chalmers, U. S.	100			13		12⅛				12⅜		12⅜		400
Allis-Chalm's, pf, U.S.	100													
Am. Agr. Chem., U.S.	100													
Am. Agr. Chem. pf, U.S.	100													
Am. Sm. & Ref., U.S.	100	45		44¾		45	44¼	44½	44	44¼	43¼	44¼	43	7,035
Am. Sm. & Ref. pf, U.S.	100	93½		93		92¼		93	92	92½	92	91		1,050
Am. Steel & Fdy., U.S.	100													
Am. S. & Fdy. pf., U.S.	100													
Col. Fuel & I., Colo.	100			62¾	59½	61	59	60	59½	61	59	62	60	13,260
Col. & H. C. & I., Colo.	100			17½	17¾	17	16½					17	16¾	975
†Crucible Steel, U. S.	100	14⅝	14⅜	14⅝	13¾	14¼	13⅜	13⅞		13¾	13⅝	13⅝	13⅜	3,895
†Crucible Steel, pf, U S	100	80⅝	80	80½	79¾	80	79⅛	79⅝	79⅛	80	78¼	79	78¼	1,423
†Mong. R. Coal, Pa.	100	10⅝		10⅝		10¼				10⅝				925
†Mong. R. Coal pf, Pa	100	39		39	38½	38¾	38⅜	39	38⅜	38¾				512
National Lead, U.S.	100	16⅝		16⅝	16¼	16¼		16¼		16¼	16	15⅝	15½	2,085
National Lead pf, U.S.	100					84	83			83⅛				165
†Phila Nat. Gas	100	42½				42¼	40			40⅝	40¼	40½	40⅜	800
†Phila Nat. Gas, pf	100													
†Pittsburg Coal, Pa.	100			27⅛	27⅜	27¼	26¾	26¾		27	26⅞	26⅝		2,253
†Pittsburg Coal pf, Pa	100	87		87½	87	87½	86⅞	86⅜	86	86⅜	86			965
Republic I & S., U.S.	100	14¼		14¼	13⅜	13½	13	13⅜	13	13½	12¾	13¼	13	7,510
Republic I. & S., pf, U.S.	100	74¼	74	74½	74	74	73½	74	72¾	73	72	73⅛	72	3,800
Sloss-Shef S. & I., Ala.	100			40		39½	39	39		39	38⅜	39	38¾	2,750
Sloss-Shef S. & I. pf, Ala.	100													
Standard Oil, U.S.	100	650		650		648	645			642		645	644	99
Tenn. C. I. & R. R., Ala.	100	53¼	52¾	52¾	49¾	49¾	48¾	48½	48	48¾	46¼	49¼	47¼	16,510
U. S. Red & Ref., U. S.	100													
U. S. Red & R. pf., U.S.	100													
U.S. Steel Corp., U.S.	100	30⅜	29⅝	29⅞	28¾	28⅞	28	28¾	28¼	29⅜	28	29	27⅝	248720
U.S. Steel Corp. pf, U.S.	100	81⅞	80⅞	81¼	79¾	80	79¼	79⅝	79¼	79¼	78½	79¼	78	76,538
Va.-Car Chem., U.S.	100	53½	52¾	52¾	52⅜	52	51	51		51¾	51	50	49½	5,190
Va.-Car Chem. pf, U.S.	100					115½								200
Va. I. C. & Coke, U. S.	100							28		28				200

*New York Stock Exchange. † Pittsburg Stock Exchange. ‡ Ex-Dividend. Total sales, 379,260 shares. * Holiday

COLORADO SPRINGS, COLO.*

Name of Company.	Par val	July 4.† H.	July 4.† L.	July 6. H.	July 6. L.	July 7. H.	July 7. L.	July 8. H.	July 8. L.	July 9. H.	July 9. L.	July 10. H.	July 10. L.	Sales
Acacia	$1			.07½		.07½	.08	.07½	.06¾	.07½	.06½	.07½	.07½	3,000
Am. Con.	1			.02¾		.02⅞		.03		.02⅝		.02⅝		
Anaconda	1			.15	.12	.12		.12½	.11	.12	.11	.15	.11	5,000
Ben Hur	1			.01⅞		.01⅞		.01½		.01½		.01⅞		
Blue Bell	1			.05		.06	.05⅜	.05		.05		.06	.05	
C. C. & M.	1			.02¼	.02⅛	.03	.02⅜	.02⅛		.02⅜		.02⅜		
C. K. & N.	1			.21⅝	.21	.21⅝	.21	.23	.21	.22¾	.20½	.21¾	.21	21,000
C. C. Con.	1			.04		.05	.04¾	.04		.04¾		.05	.04½	
Coriolanus	1					.02¾		.02½		.02¾		.02		
Des Moines	1			.03¼	.02⅛	.03⅛	.02	.03¼	.02					1,000
Dr. Jack Pot	1			.09	.08¾	.09	.08¾	.09		.09		.09		2,000
Elkton Con.	1			.43	.41¾	.41¾		.44	.41¾	.45	.41¾	.45	.41	4,160
El Paso	1			.61	.59½	.63	.55	.60	.59½	.59½	.58	.60	.59½	7,350
Fannie Rawlings	1			.03¾				.03¾		.03¾		.03¾		
Findley	1			.15		.14¼	.13½	.14¼	.13½	.14½		.14¼	.13¾	500
Gold B nd	1			.03	.02¼	.02¾		.02½		.0075	.005	.03		1,000
Gold Dollar Con.	1			.04⅞	.04¾	.04⅞	.04¾	.04⅞	.04¾	.04¾	.04¾	.04⅝	.04	8,000
Golden Cycle	1			.69	.68½	.69	.67	.70⅝	.68¾	.71	.70	.70½	.70	6,000
Golden Fleece	1			.12		.12	.06	.12	.06	.12	.06	.12	.06	
Gould	1			.03½		.03		.03	.02¾	.03	.02¾	.03	.02⅞	2,000
Hart	1			.05	.02½	.05	.02½	.05	.02	.05	.02	.05	.02½	
Isabella	1			.13	.12¼	.12½	.11⅜	.11¼	.11	.11¼	.10⅞	.11¼	.11	15,500
Jack Pot	1			.09	.08	.12	.08	.08		.10	.08			
Last Dollar	1			.55	.48	.47		.47		.47		.47		
Lexington	1			.03½		.04	.04¼	.03¾	.03¼	.03¾	.03½	.03⅝	.03½	1,000
Little Puck	1			.02		.02		.03		.02		.02½		
Mollie Gibson	1			.06	.05½	.06		.06		.05½		.06		
Moon Anchor	1			.09	.07½	.08¼	.07½	.08½	.07½	.08	.07½	.09	.07¾	1,000
New Haven	1			.02¾	.02½	.02⅝	.02¼	.02⅝	.02¼	.02¼		.03	.02½	4,000
Pharmacist	1			.03⅞		.03½	.03	.03¾		.03¼	.03	.03⅜	.03	
Pinnacle	1			.04		.04¼		.04		.04		.04		
Pointer	1			.01¼		.009		.01		.01		.01		
Portland	1			1.31¾	1.25	1.29	1.26	1.30	1.27	1.30	1.27	1.30	1.25	
Prince Albert	1			.02¼	.02	.02⅛	.02	.02¼		.02¼		.02⅛		
Vindicator	1			.91		.96		.90	.88	.81		.90		700
Work	1			.05⅝		.05¼	.05¼	.05¼	.05	.05¼		.05⅝	.05⅝	5,000

*Colo. Springs Mining Stock Exchange. † Holiday. All mines are in Colorado. Total sales 88,150 shares.

COLORADO SPRINGS. (*By Telegraph.*)

Name of Company.	July 13. H.	July 13. L.	July 14. H.	July 14. L.	Name of Company.	July 13. H.	July 13. L.	July 14. H.	July 14. L.
Acacia	.07½	.07	.07½	.07	Isabella	.11¾	.11¼	.11¾	
Am. Con	.02¼	.02	.02	.01½	Jack Pot	.10	.08	.10	.08
Anaconda	.12⅛	.11¾	.12½	.11	Keystone	.04½	.03½	.04½	.03¾
Blue Bell			.05⅞	.05	Last Dollar	.55	.47	.55	.47
Cripple Creek Con	.05	.04	.04½	.04	Lexington	.03¾	.03½	.04	.03⅝
C. K. & N.	.21	.20	.20⅜	.20	Little Puck	.03	.02	.03	.02
Doctor Jack Pot	.09	.08½	.09	.08¾	Mollie Gibson	.05½	.05	.06	.05
Elkton, Con	.45	.41	.40½	.40¼	Moon Anchor	.08¼	.07¾	.08½	.08
El Paso	.59½	.57	.60	.58	Old Gold	.06⅞	.06⅝	.06⅞	.06⅛
Findley	.14¼	.13	.14¼	.13⅝	Pharmacist	.03⅝	.03	.03⅜	.03⅛
Gold Dollar Con	.04⅞	.04¾	.04⅞	.04¾	Pinnacle	.04	.03	.04¼	.04
Golden Cycle	.72	.70	.72	.69	Portland	1.30	1.25	1.30	1.25
Golden Fleece	.12	.06	.12	.08	Vindicator	.91	.80	.90	.85
Gould	.03½	.02¾	.03	.02⅞	Work	.05½	.05	.05¾	.05

SAN FRANCISCO (*By Telegraph*)

Name of Company.	July. 13.	July. 14.	Name of Company.	July. 13.	July. 14.
Belcher	.44	.43	Justice	.24	.24
Best & Belcher	2.10	2.00	Mexican	1.05	1.05
Caledonia	1.30	1.30	Occidental Con.	.30	.30
Challenge Con.	.50	.48	Ophir	1.55	1.55
Chollar	.22	.21	Overman	.30	.30
Confidence	1.30	1.25	Potosi	.23	.24
Con. Cal. & Va.	1.40	1.45	Savage	.18	.18
Con. Imperial	.05	.04	Sierra Nevada	.58	.58
Crown Point	.23	.23	Union Con.	.85	.86
Gould & Curry	.39	.38	Utah Con.	.34	.37
Hale & Norcross	.60	.58	Yellow Jacket	.73	.72

STOCK QUOTATIONS.

MEXICO*. July 3.

Name of Company	Share Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Durango.				
Co. Min. de Penoles	2,500	$50.00	$4,100	$4,800
San Andres de la Sierra	200	.....	10,000	.....
Guananjuato.				
Angustias, Pozos	2,400	5.00	90	100
Cinco Senores y An., aviadoras	2,000	15.00	190	200
Cinco Senores y An., aviada	400	10.00	170	175
Providencia, San Juan de la Luz	6,000	2.00	150	160
Queenslard y Australia	300	.....	60	80
Guerrero.				
Delfina, 1st serie	2,500	.....	40	60
Delfina, 2d serie	2,500	.....	29	30
Garduno y Anexas	7,200	.....	45	60
Hidalgo.				
Amistad y Concordia	9,600	6.90	86¼	89
Carmen, aviada	1,100	.....	140	150
Guadalupe Fresnillo Mill	1,000	.....	230	270
Guadalupe Fresnillo Mine	1,400	.....	70	80
La Blanca, aviadora	1,536	.....	240	300
La Blanca, aviada	768	.....	825	840
La Reina y An., aviadora	5,600	.....	21	22
Luz de Maravillas, aviadas	1,100	.....	0	20
Maravillas y An., aviador	1,680	.....	90	110
Maravillas el Lobo	1,000	.....	130	180
Palma y An., aviador	1,800	.....	.....	12
Real del Monte	2,554	10.00	.....	.....
Refugio, avadia	12,800	.....	7	5
Santa Ana y An., aviadora	1,800	.....	30	40
Santa Ana y An., aviada	600	.....	25	30
Sta. Gertrudis y An., aviadas	9,600	.....	8	10
Sta. Gertrudis y An., aviadora	28,800	1.00	85¼	82½
Santo Tomas Apostol aviadoras	5,100	.....	3	6
San Felipe de Jesus, aviadora	3,600	.....	18	20
San Felipe de Jesus, aviada	1,200	.....	.....	10
San Rafael y An., Trompillo	1,200	12.00	1,240	.....
San Rafael y An., aviada	1,200	4.00	460	470
Soledad, aviada	960	0 .00	460	470
Sorpresa, aviada	960	5.00	330	335
Mexico.				
Alacran	$2,400	.....	60	70
Aldebarran	.....	.....	103	108
Buen Despacho	3,000	.....	80	83
Dos Estrellas	3,000	30.00	2,250	2,260
La Esperanza (El Oro)	3,000	10.00	1,495	1,500
La Reformia, aviadores	2,000	.....	88	90
Providencia, pagadoras	1,600	.....	.....	.....
Providencia, liberadas	900	.....	.....	.....
Santa Ana, Esperanza	2,400	.....	70	90
Michoacan.				
Luz de Borda, aviadora	3,000	.....	96	100
Luz de Borda, aviada	1,000	.....	27	20
Nerevo Leon:				
La Fraternal	1,000	.....	600	550
Norias de Bajan	1,000	.....	700	800
Santiago y An., Tial	4,000	.....	.....	.....
San Luis Potosi.				
Concepcion y An	3,000	.....	98	105
El Barreno, aviadora	2,000	2.00	28	32
Sta. Maria de la Paz	2,400	20.00	670	700
San Diego y Annexas	2,400	4.00	25	28
Zacatecas.				
Asturiana y An	2,500	.....	50	62
Candelaria y Pinos	2,500	10.00	260	270
Cubiertas	2,400	.....	.....	.....
Esperanza y An	2,400	.....	50	62
Lourdes	2,500	.....	50	60
Luz de Minillas, pagadoras	2,000	.....	10	15
Nueva Quebradilla, aviadoras	2,400	.....	90	100
Nueva Quebradilla, aviadas	600	.....	45	40
San Carlos y Annexas	2,500	20.00	130	150
Sta. Maria de Gaud	2,500	10.00	75	85
Miscellaneous.				
Bartolome de Medina	2,000	1.50	70	73
Guadalupe Hacienda	10,000	6.00	.....	.....
La Luz Hac. (Pachuca)	3,750	.....	280	290
La Reina (Chihuahua)	192	.....	.....	.....
Naica (Chihuahua)	100	.....	11,000	13,000
Natividad (Oaxaca) aviadora	1,800	10.00	1,000	1,100
Natividad (Oaxaca) aviadas	600	4.00	1,000	1,100
San Francisco Hac	6,000	1.00	51	55
Santa Ana Huantia Morelos	4,000	.....	.....	.....
Union Hacienda	3,000	5.00	225	240

*Values are in Mexican currency.

SALT LAKE CITY.* July 4.

Name of Company	Shares.	Par Val	High	Low	Sales.
Ajax	300,000	$10	.24½	.24	1,300
Ben Butler	500,000	1	.12¾	.11½	2,223
California	300,000	1	.15½	.13½	8,500
Carisa	500,000	1	.11	.10	9,100
Con. Mercur	1,000,000	5	1.46	1.45	3,900
Century	.....	.....	.54½	.54	200
Daly-Judge	300,000	1	10.85	10.75	450
Daly-West	300,000	20	43.25	42.00	555
Grand Central	250 000	1	4 52	4.50	300
L Mammoth	150,000	1	.77¾	.68¼	18,400
M. Washington	300,000	.....	.02	.01½	7,000
Mammoth	400,000	25	.....	.....	.....
Majestic Cop	.....	.....	.....	.....	.....
May Day	400,000	0.25	.19¼	.18	8,500
N. Y. Bonanza	.....	.....	.24¾	.22	4,100
Petro	.....	.....	.....	.....	.....
Sacramento	1,000,000	5	.24½	.22½	15,500
Silver Shield	.....	.....	.....	.....	.....
South Swansea	300,000	1	.17	.17	500
Star Con	500,000	1	.32½	.23	24,700
Uncle Sam	500,000	1	.22½	.20	1,580
Utah	100,000	10	.63	.62	200
Victor	500,000	1	.19½	.18¾	9,900
Wabash	.....	.....	.23½	.22½	7,500
Yankee Con	500,000	1	.34	.33½	400

All mines are in Utah. *By our Special Correspondent. Total sales, 125,508 shares.

ST. LOUIS, MO June 27.

Name.	Capital Stock	Par val.	Prices. Bid.	Prices. Ask.
Am.-Nettie, Colo	$3,000,300	$10	$0.50	$0.75
Catherine Lead, Mo.	500,000	10	1.25	2.25
Central Coal & C.	1,875,000	100	63.25	65.00
Central C. & C., pf.	1,875,000	100	74.00	75.50
Central Lead, Mo.	1,000,000	10	100.00	125.00
Columbia Lead, Mo.	$500,000	10	$11.00	15.00
Con. Coal, Ill.	500,000	100	22.50	23.00
Doe Run Lead Co.	1,500,000	100	107.50	110.00
Granite Bimet. Mt.	1,000,000	10	60	.68
St. Joe Lead, Mo.	6,000,000	10	15.50	17.00

*From Our Special Correspondent.

PHILADELPHIA, PA.*

Name and Location of Company.	par val	July 8. H.	July 8. L.	July 9. H.	July 9. L.	July 10. H.	July 10. L.	July 11. H.	July 11. L.	July 13. H.	July 13. L.	July 14. H.	July 14. L.	Sales
Am. Alkali, Mich	$50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Am. Cement	10	8	8	8	8	8	8	.....	.....	7½	.....	.....	.....	270
Cambria Iron, Pa.	50	.....	.....	.....	.....	.....	.....	.....	.....	47	.....	.....	.....	33
Cambria Steel, Pa.	50	24	23⅞	25⅛	23¼	23	22⅝	23	22⅝	22⅝	22¼	22⅝	22¼	3,727
Penn. Steel, pfd.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Susq. I. & S., Pa.	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
United Gas I., Pa.	50	89	88⅜	88⅜	87½	87⅜	87½	87	86½	86	83⅜	85¾	84½	5,770
Warwick I. & Steel	10	.....	.....	4¾	4¾	.....	.....	4¼	.....	4¾	.....	4¾	.....	115

*Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 10,421 shares.

LONDON. July 3.

Name and Country of Company	Shares Issued.	Par value.	Latest dividend. Amt.	Latest dividend. Date	Quotations. Buyers.	Quotations. Sellers.
		£. s. d.	s. d.		£. s. d.	£. s. d.
Alaska-Treadwell, g., Alaska	200,000	5 0 0	3 0	Apr., 1903	4 12 6	4 17 6
Anaconda, c. s., Montana	1,200,000	5 0 0	2 0	May, 1903	4 3 9	4 6 3
Arizona, c., Def., ord	63,444	1 0 0	5 6	Feb., 1903	7 15 0	8 5 0
Arizona, pref., ord	316,350	1 0 0	5 6	Feb., 1903	8 0 0	8 5 0
Camp Bird, g., Colorado	738,000	1 0 0	1 6	July, 1903	1 10 0	1 12 6
Central Chile, c., Chile	276,248	1 0 0	.....	.....	3 0	4 0
Copiapo, c., Chile	112,500	2 0 0	6 10	May, 1903	1 17 6	2 2 6
De Lamar, g. s., Idaho	80,000	1 0 0	2 0	Nov., 1902	10 0	12 6
El Oro, g., Mexico	1,000,000	1 0 0	1 6	Dec., 1902	1 13 9	1 16 3
Frontino & Bolivia, g., Colombia	128,662	1 0 0	3 0	July, 1901	15 0	17 6
Le Roi, g., British Col	200,000	5 0 0	5 0	Nov., 1899	1 2 6	1 5 0
Le Roi No. 2, g., British Col	120,000	5 0 0	5 0	May, 1902	1 5 0	1 7 6
Mesquital, Mexico	250,000	2 0	3	Feb., 1903	2 6	3 6
Montana, g. s., Montana	657,128	1 0 0	6	April, 1899	1 9	2 3
Mountain, c., Cal	250,000	5 0 0	4 0	Nov., 1902	3 2 6	3 7 6
Stratton's Independence, Colorado	1,000,007	1 0 0	6	April, 1902	9 3	9 9
*St. John del Rey., g., Brazil	546,265	1 0 0	8	June, 1903	15 6	16 6
Utah Con., g. c., (Highland Boy), Utah	300,000	1 0 0	7 0	Jan., 1903	5 10 0	6 0 0
Ymir, g., British Col	200,000	1 0 0	1 0	Mar., 1902	6 3	8 9
European:						
Linares, l., Spain	15,000	3 0 0	9	Oct., 1902	2 0 0	2 10 0
Mason & Barry, c., sul., Port'g'l	185,172	1 0 0	11 0	May, 1903	3 10 0	3 15 0
Rio Tinto, c., Spain	325,000	5 0 0	27 6	Apr., 1903	46 7 6	46 12 6
Rio Tinto, pref., Spain	325,000	5 0 0	2 6	Apr., 1903	6 0 0	6 5 0
Tharsis, c., Spain	625,000	2 0 0	6 0	May, 1903	3 17 6	4 2 6
Australia and New Zealand:						
Assoc. Gold Mines, W. Australia	495,388	1 0 0	2 0	July, 1903	1 16 3	1 18 9
Briseis, Tin, Tasmania	600,000	1 0 0	.....	.....	4 9	5 3
Broken Hill Pr'p., s., N. S. Wales	960,000	8 0	1 0	Feb., 1903	1 8 0	1 9 0
Cosmopolitan Prop., W. Australia	385,000	1 0 0	6	July, 1902	17 6	18 6
Golden Horse Shoe, W. Australia	300,000	5 0 0	6 0	Apr., 1903	7 17 6	8 0 0
Great Fingall Con., W. Australia	250,000	1 0 0	5 0	Sept., 1902	7 13 9	7 16 3
*Great Bo'd'r Pr'p., W. Australia	1,750,000	2 0	6	June, 1903	1 6 0	1 6 3
Ivanhoe Gold Corp. W. Australia	200,000	5 0 0	4 0	Jan., 1903	8 13 9	8 16 3
Kalgurli, g., W. Australia	120,000	1 0 0	2 6	July, 1903	4 8 9	4 11 3
Lake View Cons., g., W. Australia	250,000	1 0 0	rts.	Aug., 1902	2 12 6	2 15 0
Mt. Lyell M. & R. L., c., Tasmania	275,000	3 0 0	1 0	July, 1903	3 2 6	3 5 0
*Mt. Morgan, g., Queensland	1,000,000	1 0 0	3	May, 1903	3 2 6	3 5 0
Waihi, g., New Zealand	497,412	1 0 0	2 6	June, 1903	5 2 6	5 5 0
Indian:						
Champion Reef, g., Colar Fields	473,000	10 0	4 6	May., 1903	7 5 0	7 7 6
Mysore Gold, Colar Fields	566,043	10 0	4 0	July, 1903	7 0 0	7 2 6
Nundydroog, g., Colar Fields	484,000	10 0	1 6	Mar., 1903	2 10 0	2 12 6
Ooregum, g., Colar Fields	343,000	10 0	1 6	Apr., 1903	1 11 3	1 13 9
Ooregum, pref., g., Colar Fields	240,000	10 0	1 6	Apr., 1903	2 0 0	2 2 6
African:						
Angelo, g. Transvaal	600,000	1 0 0	6 0	July, 1903	7 0 0	7 5 0
Bonanza, g., Transvaal	200,000	1 0 0	10 0	June, 1903	4 2 6	4 5 0
British South Africa	4,436,019	1 0 0	rts.	May, 1899	2 15 0	2 18 3
Cape Copper, S. Africa	300,000	2 0 0	1 0	June, 1903	2 10 0	2 12 6
Cape Copper, pref., S. Africa	75,000	2 0 0	1 0	June, 1903	2 12 6	2 17 6
City and Sub'n (New), g., Transvaal	340,000	4 0 0	8 0	Aug., 1899	6 11 3	6 13 9
Crown Reef, g., Transvaal	120,000	1 0 0	4 0	June, 1903	16 15 0	17 0 0
De Beers Con., d., pref., Cape Colony	800,000	2 10 0	10 0	July, 1903	19 6 3	19 8 9
De Beers Con., def	1,000,000	2 10 0	15 0	Mar., 1903	20 0 0	20 2 6
East Rand, Prop., Transvaal	970,000	1 0 0	5 0	June, 1903	7 7 6	7 10 0
Ferrcira g., Transvaal	90,000	1 0 0	15 0	June, 1903	21 0 0	21 10 0
Geldenhuis Est., g., Transvaal	200,000	1 0 0	6 0	June, 1903	6 7 6	6 10 0
Geduld, g , Transvaal	400,000	1 0 0	rts.	Mar., 1902	6 13 9	6 16 3
Henry Nourse, g., Transvaal	125,000	1 0 0	8 0	Feb., 1903	9 2 6	9 7 6
Jagersfontein, d., Orange F. S.	200,000	5 0 0	6 0	Nov., 1899	29 7 6	29 12 6
Jubilee, g., Transvaal	50,000	1 0 0	5 0	June, 1903	5 7 6	5 12 6
Jumpers, Transvaal	100,000	1 0 0	5 0	Aug., 1899	3 15 0	4 0 0
Langlaagte Est., g., Transvaal	470,000	1 0 0	3 0	Sept., 1899	4 3 6	4 5 0
May Con , g., Transvaal	288,750	1 0 0	3 0	July, 1903	4 3 9	4 6 3
Meyer & Charlton, g., Transvaal	100,000	1 0 0	3 0	Feb., 1903	5 10 0	5 15 0
Modderfontein, g., Transvaal	290,000	1 0 0	rts.	Apr., 1902	9 18 9	10 1 3
Namaqua, c., Cape Colony	94,331	2 0 0	2 0	June, 1902	2 17 6	3 2 6
Primrose (New), g., Transvaal	325,000	1 0 0	2 0	Feb., 1903	2 16 3	2 18 9
Rand Mines, g., S. Africa	1,795,956	5 0	4 0	June, 1902	10 3 9	10 5 0
Robinson, g., Transvaal	750,000	5 0 0	5 6	Aug., 1903	10 7 6	10 12 6
Robinson Deep, g., Transvaal	950,000	1 0 0	5 0	May, 1899	4 17 6	5 0 0
Rose Deep, Transvaal	425,000	1 0 0	2 0	Feb. 1903	8 15 0	9 0 0
Salisbury, g., Transvaal	100,000	1 0 0	2 0	Mar., 1899	2 10 0	2 15 0
Sheba, g., Transvaal	1,075,000	1 0 0	6	July, 1898	19 6	1 0 6
Village Main Reef, Transvaal	400,000	1 0 0	5 0	Oct., 1902	8 5 0	8 10 0
Wemmer, Transvaal	80,000	1 0 0	5 0	May, 1903	12 5 0	12 15 0

c.—Copper. d.—Diamonds. g.—Gold l.—Lead. s.—Silver. *Ex-Dividend.

LONDON. (*By Cable*).*

Name of Company.	July 7. £.	July 7. s.	July 7. d.	July 14. £.	July 14. s.	July 14. d.
Anaconda	4	5	0	4	5	0
British South Africa	2	16	3	2	15	0
Camp Bird	1	10	0	1	9	6
Con. Gold-Fields	7	0	0	6	16	3
De Beers Con. def	20	3	0	19	17	6
East Rand	7	6	3	7	6	3
El Oro, Mex	1	13	9	1	12	6
Jagersfontein	30	0	0	29	0	0
Johannesburg Invest	3	2	6	3	1	3
Modderfontein	10	6	3	9	17	6
Rand Mines	10	13	9	10	2	6
Rio Tinto com	47	12	6	46	10	0
Simmer & Jack	1	10	0	1	8	9
Tomboy	1	18	9	1	13	0

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York.

PARIS. June 25.

Name of Company.	Country.	Product.	Capital Stock.	Par value.	Latest divs.	Prices. Opening.	Prices. Close.
			Francs.	Fr.	Fr.	Fr.	Fr.
Boleo	Lower Cal	Copper	.....	500	176.00	1,360.00	1,361.00
Champ d'Or	S. Africa	Gold	3,375,000	25	3.75	18.50	19.75
Fraser River	Brit. Col'mb.	Gold	250,000	25	.....	6.50	6.50
Huanchaca	Bolivia	Silver	40,000,000	125	5.00	92.75	93.75
Laurium	Greece	Zinc, Lead	16,300 000	500	25.00	341.00	339.00
Metaux, Cie. Fran. de	France	Metal dealers	25,000,000	500	22.50	473.00	467.00
Nickel	N. Caled'nia	Nickel	15,000,000	250	22.50	464.00	461.00
Sedalia & California	Calif., U. S.	Oil	1,000,000	1	.....	7.75	8.25
Vielle Montagne	Belgium	Zinc	9,000,000	30	30.00	663.00	654.00

TORONTO, ONT.* July 13.

Name of Company.	par val	Prices. High.	Prices. Low.	Sales.
Black Tail	$1	.04½	.02	.....
Cariboo (Mc. K.)	1	.14	.10	.....
Cariboo (Hyd.)	1	.75	.....	.....
Center Star	1	.30	.25	.....
Crows Nest, C.	100	400	275	.....
Dominion Coal, com	100	1.06	.89½	385
Dominion S. & I.	100	.21¼	.14½	.....
Dominion S. & I., pref.	100	.....	.....	.....
Fairview	1	.05½	.04	.....
Giant	1	.04	.02	4,000
Granby Smelter	$10	490	400	.....
Mountain Lion	1	.28	.20	.....
North Star	1	.15	.11	2,500
Nova Scotia Steel, com	100	1.00½	.92½	.....
Payne	1	.28	.15	11,000
Rambler Cariboo	1	.40	.....	.....
Republic	1	.04	.02	.....
St. Eugene	1	.50	.28	.....
Virtue	1	.08	.05	.....
War Eagle Con	1	.14	.10	4,000

*Standard Stock and Mining Exchange. Total sales 21,885 shares.

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHCLESALE PRICES.

(See also Market Reviews.)

	Cust.	Meas.	Price.
ABRASIVES—			
Carborundum, f.o.b. Niagara Falls, Powd., F.FF.FFF.	lb.		$0.08
Grains	"		.10
Corundum, N. C.	"		.07@.10
Chester, Mass.	"		.04½@.05
Barry's Bay, Ont.	"		.07½@.09½
Mont. car-lots, f.o.b., Chicago	"		.07@.07½
Crushed Steel, f.o.b. Pittsburg	"		.05½
Emery, Turkish flour in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Naxos flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Chester flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Peekskill, f.o.b. Easton, Pa., flour, in kegs	"		.01½
Grains, in kegs	"		.02½
Crude, ex-ship N. Y.; Abbott (Turkey)	lg.ton		26.50@30.00
Kuluk (Turkey)	"		22.00@24.00
Naxos (Greek) h. gr.	"		26.00
Garnet, as per quality	sh.ton		25.00@35.00
Pumice Stone, Am. Powd	lb.		.01¾@.02
Italian, powdered	"		.01½
Lump, per quality	"		.04@.40
Rottenstone, ground	"		.02½@.04½
Lump, per quality	"		.06@.20
Rouge, per quality	"		.10@.30
Steel Emery, f.o.b. Pittsburg.	"		.07
ACIDS—			
Boracic, crystals	"		.10¾@.11
Powdered	"		.11¼@.11½
Carbonic, liquid gas	"		.12½
Chromic, crude	"		.20
Hydrofluoric, 30%	"		.03
48%	"		.05
60%	"		.11
Sulphurous, liquid anhy. f.o.b. Bound Brook, N.J.	"		.06
ALCOHOL—Grain	gal.		2.39@2.40
Refined wood 95@97%	"		.60@.65
Purified	"		1.20@1.50
ALUM—Lump	100 lbs.		1.75
Ground	"		1.85
Porous	"		.95
Powdered	"		3.00
Chrome, com'l	"		2.75@3.00
ALUMINUM—			
Nitrate	lb.		1.50
Oxide, com'l, common	"		.06½
Best	"		.20
Pure	"		.80
Hydrated	100 lbs.		2.60
Sulphate, com'l	"		1.25@1.50
AMMONIA—			
Aqua, 16°	lb.		.03
18°	"		.03¼
20°	"		.03¾
26°	"		.05½
AMMONIUM—			
Carbonate, lump	"		.07½
Powdered	"		.08¼
Muriate	"		.05¾
Lump	"		.09
Nitrate, white pure (99%)	"		.12
Phosphate, com'l	"		.09
Pure	"		.12
ANTIMONY—Glass	"		.30@.40
Needle, lump	"		.05½@.06
Powdered, ordinary	"		.05¾@.07¼
Oxide, com'l white, 95%	"		.09½
Com'l white, 95%	"		.12
Com'l gray	"		.07
Sulphuret, com'l	"		.16
ARSENIC—White powd.	"		.02⅞@.03
Red			.06¾@.06½
ASPHALTUM—			
Ventura, Cal.	sh.ton		32.00
Cuban	lb.		.01½@.03½
Egyptian, crude	"		.05½@.06
Trinidad, refined	sh. ton		35.00
San Valentino (Italian)	lg. ton		16.00
Seyssel (French), mastic	sh. ton		21.00
Gilsonite, Utah, ordinary	lb.		.03
Select	"		.08¾
BARIUM—			
Carb. Lump, 80@90%	sh.ton		25.00@27.50
92@98%	"		26.00@29.00
Powdered, 80@90%	lb.		.01¾@.02
Chloride, com'l	100lbs.		1.67½@1.76
Chem. pure cryst	lb.		.05
Nitrate, powdered	"		.05¼

	Cust.	Meas.	Price.
BARIUM			
Sulphate (Blanc Fixe)	lb.		$0.01⅞
BARYTES—			
Am. Crude, No. 1	sh.ton		9.00
Crude, No. 2	"		8.00
Crude, No. 3	"		7.75
Floated	"		18.50
Foreign, gray	"		13.50
Snow white	"		17.00
Floated	"		19.00
BAUXITE—Ga. or Ala. Mines:			
First Grade	lg.ton		5.50
Second grade	"		4.75
BISMUTH—Subnitrate	lb.		2.00
Subcarbonate	"		2.25
BITUMEN—"B"	"		.03½
"A"	"		.05
BONE ASH	"		.02¼@.02½
BORAX	"		.07¼@.07½
BROMINE—Bulk.	"		.40@.48
CADMIUM—Metallic	"		1.40
Sulphate	100 lbs.		2.00@2.50
CALCIUM—Acetate, gray	"		1.40
" brown	"		.95
Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh.ton		70.00
Carbonate, ppt.	lb.		.05
Chloride	100 lbs.		.70@.90
CEMENT—			
Portland, Am., 400 lbs.	bbl.		2.00@2.15
Foreign	"		1.95@2.50
"Rosendale," 300 lbs	"		.80
Slag cement, imported	"		1.65
CERESINE—			
Orange and Yellow	lb.		.13
White	"		.14
CHALK—Lump, bulk	sh.ton		3.25
Ppt. per quality	lb.		.04¼@.05¼
CHLORINE—Liquid	"		.30
Water	"		.10
CHROME ORE—			
(50% ch.) ex-ship N. Y.	lg.ton		24.75
Bricks f.o.b. Pittsburg	M		175.00
CLAY, CHINA—Am. com., ex-dock, N. Y.	lg.ton		8.25
Am. best, ex-dock, N. Y.	"		9.25
English, common	"		10.50
Best grade	"		16.25
Fire Clay, ordinary	sh.ton		4.25
Best	"		6.00
Slip Clay	"		5.00
COAL TAR PITCH	gal.		.08
COBALT—Carbonate	lb.		1.75
Nitrate	"		1.50
Oxide—Black	"		2.50@2.65
Gray	"		2.52@2.75
Smalt, blue ordinary	"		.06
Best	"		.20
COPPERAS—in bulk	100 lbs.		.47½
In bbls	"		.52½
COPPER—Carbonate	lb.		.18@.19
Chloride	"		.25
Nitrate, crystals	"		.35
Oxide, com'l	"		.19
CRYOLITE	"		.06½
EXPLOSIVES—			
Blasting powder, A	25 lb. keg		.65
Blasting powder, B	"		1.40
"Rackarock," A	lb.		.25
"Rackarock," B	"		.18
Judson R.R. powder	"		.10
Dynamite (20% nitro-glycerine)	"		.13
(30% nitro-glycerine)	"		.14
(40% nitro-glycerine)	"		.15
(50% nitro-glycerine)	"		.16½
(60% nitro-glycerine)	"		.18
(75% nitro-glycerine)	"		.21
Glycerine for ultro, (32-2-10° Be.)	"		.13¼@.13⅞
FELDSPAR—Ground	sh.ton		8.00@9.00
FLINT PEBBLES—Dan. Best.	lg.ton		14.75
French, Best	"		11.75
FLUORSPAR—			
Am. lump, 1st grade	sh.ton		14.40
2d grade	"		13.90
Gravel and crushed, 1st gr	"		13.40
2d grade	"		12.40
Ground, 1st grade	"		17.90
Ground, 2d grade	"		16.50
Foreign, lump	"		8.00@12.00
Ground	"		11.50@14.00
FULLER'S EARTH—	100 lbs.		.80

	Cust.	Meas.	Price.
GRAPHITE—Am. f.o.b. Providence, R. I., lump	sh.ton		$8.00
Pulverized	"		30.00
Am., pulverized other than R. I., f.o.b. N. Y.	"		45.00
Best flake	"		150.00
German, com. pulv.	lb.		.01¼@.01½
Best pulverized	"		.01½@.02
Ceylon, common pulv.	"		.02¾@.03½
Best pulverized	"		.04@.08
Italian, pulv	"		.01¼
GYPSUM—Ground	sh.ton		8.00@8.50
Fertilizer	"		7.00
Rock	lg.ton		4.00
English and French	"		14.00@16.00
INFUSORIAL EARTH—Gr'd.			
American best	"		20.00
French	"		37.50
German	"		40.00
IODINE—Crude	100 lbs.		2.45
IRON—Muriate	lb.		.05
Nitrate, com'l	"		.01¼
True	"		.04
Oxide, pure copperas color.	"		.05@.10
Purple-brown	"		.02
Venetian red	"		.01@.01½
Scale	"		.01@.03
KAOLIN—(See China Clay.)			
KRYOLITH—(See Cryolite.)			
LEAD—Acetate, white	"		.08¼@.08½
Brown	"		.06¼@.06½
Nitrate, com'l	"		.06½
" gran.	"		.08¼
LIME—Com., abt. 250 lbs.	bbl.		.75
Finishing	"		.95
MAGNESITE—Greece.			
Crude (95%)	lg. ton		5.50@6.00
Calcined	sh.ton		15.50
Bricks best imp., f.o.b., N.Y.	M.		155.00
" domes., per qual., f.o.b. Pittsburg	"		160.@200.
MAGNESIUM—			
Carbonate, light, fine pd.	lb.		.05
Blocks	"		.07@.09
Chloride, com'l	"		.01¾
Fused	"		.20
Nitrate	"		.60
Sulphate	100 lbs.		.75@.95
MANGANESE—Powdered,			
70@75% binoxide	lb.		.01¼@.01½
Crude pow'd.			
75@85% binoxide	"		.01½@.02¼
85@90% binoxide	"		.02¼@.03¼
90@95% binoxide	"		.03¼@.05½
Carbonate	"		.16@.20
Chloride	"		.04
Ore, 50%, Foreign	unit		.18@.19
Domestic	"		.30
MARBLE—Flour	sh.ton		6.00@7.00
MERCURY—Bichloride	lb.		.77
MICA—N. Y. gr'nd, coarse	sh.ton		33.00@38.00
Fine	lb.		.00⅞@.02
Sheets, N. C., 2x4 in.	"		.30
3x3 in.	"		.80
3x4 in.	"		1.50
4x4 in.	"		2.00
6x6 in.	"		3.00
MINERAL WOOL—			
Slag, ordinary	sh.ton		19.00
Selected	"		25.00
Rock, ordinary	"		32.00
Selected	"		40.00
NICKEL Oxide, No. 1	lb.		1.00
No. 2	"		.60
Sulphate	"		.20@.21
OILS—Black, reduced 29 gr.:			
25@30, cold test	gal.		.13@.13½
15, cold test	"		.13½@.14
Zero	"		.18@.18½
Summer	"		.12½@.13
Cylinder, dark steam ref.	"		.14½@.15
Dark, filtered	"		.18½@.19
Light, filtered	"		.20½@.20
Extra cold test	"		.25@.31
Gasoline, 86°@90°	"		.16@.21
Naphtha, crude, 68°@72°	bbl.		11.20
"Stove"	gal.		.14½
Linseed, domestic raw	"		.37@.40
Boiled	"		.42
Calcutta, raw	"		.75
OZOKERITE	lb.		.11½
PAINTS AND COLORS—			
Chrome green, common	"		.03
Pure	"		.16
Yellow, common	"		.10¼
Best	"		.14
Lampblack, com'l	"		.04½
Refined	"		.07
Litharge, Am. pow'd	"		.05¾@.06
English flake	"		.08¼@.08½
Glassmakers'	"		.06½@.08¼

	Cust.	Meas.	Price.
PAINTS AND COLORS—			
Metallic, brown	sh.ton		$19.00
Red	"		16.00
Ocher, Am. common	"		9.25@10.00
Best	"		21.25@25.00
Dutch, washed	lb.		.04¾
French, washed	"		.01½@.01⅞
Orange mineral, Am.	"		.08⅛@.08¾
Foreign, as to make	"		.08½@.10¼
Paris green, pure, bulk	"		.12
Red lead, American	"		.06¼@.06½
Foreign	"		.06⅝@.08
Turpentine, spirits	gal.		.51@.51½
White lead, Am., dry	lb.		.05½@.05¾
American, in oil	"		.07@.09
Foreign, in oil	"		.07@.07¼
Zinc, white, Am., ex dry	"		.04⅝@.04¾
Foreign, red seal, dry	"		.06@.08½
Green seal, dry	"		.06½@.09½
POTASH			
Caustic, ordinary	"		.04½@.04⅞
Elect. (90%)	"		.06¼
POTASSIUM—			
Bicarbonate cryst	"		.08¼
Powdered or gran.	"		.14
Bichromate, Am.	"		.08¼@.08¾
Scotch	"		.08½@.09
Bromide	"		.25@.38
Carbonate (80@85%)	"		.03½@.04¾
Chlorate, powd.	"		.07¼@.07⅝
Crystals	"		.07@.07½
Chromate	"		.35
Cyanide (98@99%)	"		.20
Kainit	lg.ton		9.30
Manure salt, 20%	100 lbs.		.66
D'le Manure Salt, 48@53%	"		1.12
Muriate, 80@85%	"		1.83
95%	"		1.86
Permanganate	lb.		.09⅛@.09¾
Prussiate, yellow	"		.13¼@.13½
Red	"		.34
Sulphate, 90%	100 lbs.		2.11
96%	"		2.14
Sylvanit	unit		.41
QUARTZ—(See Silica).			
SALT—N. Y. com. fine 280 lbs	bbl.		.72@1.18
N. Y. agricultural	sh.ton		4.40
SALTPETRE—Crude	100 lbs.		3.20@3.35
Refined	"		4.00@4.50
SILICA—Best foreign	lg.ton		10.00@11.00
Ground quartz, ord.	sh.ton		6.00@8.00
Best	"		12.00@13.00
Lump quartz	"		2.50@4.00
Glass sand	"		2.75
SILVER—Chloride	oz.		.65
Nitrate Crystals	"		.33½
Oxide	"		.85@1.10
SODIUM—			
Bicarb., ordinary, f.o.b. w'ks	100 lbs.		1.25
Extra domes. f.o.b. w'ks	"		3.50
Foreign, f.o.b. N. Y.	"		1.60
Bichromate	lb.		.06¼
Carbonated ash, high test, in bags, f.o.b. works	100 lbs.		.75@.82½
Foreign, f.o.b. N. Y.	"		.90@.92½
Caustic, 60@78%, f.o.b. w'ks	"		1.65@1.70
Foreign, f.o.b. N. Y.	"		1.90@2.00
Chlorate, com'l	"		.07¼@.07⅝
Hyposulphite, Am.	"		1.60@1.65
German	"		1.70@1.90
Nitrate, spot	"		2.05
Shipments	"		2.00
Peroxide	lb.		.45
Phosphate	"		.02½@.02¼
Prussiate	"		.09¾
Sal soda, f.o.b. works	100 lbs.		.60
Foreign, f.o.b. N. Y.	"		.67½
Silicate, conc.	lb.		.05
Com'l	"		.01
Sulphate, com'l	100 lbs.		.82½
Sulphide	lb.		.01¼
Sulphite crystals	"		.02½
SULPHUR—Roll	100 lbs.		1.85
Flour	"		1.90
Flowers, sublimed	"		2.15
TALC—N. C., 1st grade	sh.ton		18.00
N. Y., Fibrous, best	"		10.20
French, best	100 lbs.		2.00
Italian, best	"		2.25
TAR—Regular	bbl.		2.40
Oil barrels	"		4.40
TIN—Crystals	lb.		.22½@.23
Oxide	"		.45
URANIUM—Oxide	"		2.25@3.00
ZINC—Metallic, ch. pure	"		.07@.09¼
Carbonate, ppt.	"		.09
Chloride solution, com'l	"		.02¼
Chloride granular	"		.04¼@.04⅝
Dust	"		.04⅝@.04½
Sulphate	"		.02½@.02⅝

THE RARE EARTHS.

BORON—Nitrate	lb.		$1.50
CALCIUM—Tungstate (Scheelite)	"		.60
CERIUM—Nitrate	"		10.00
DIDYMIUM—Nitrate	"		35.00
ERBIUM—Nitrate	"		40.00
GLUCINUM—Nitrate	"		20.00
LANTHANUM—Nitrate	"		30.00
LITHIUM—Carbonate	"		1.35
LITHIUM—Nitrate	oz.		.90
STRONTIUM—Nitrate	lb.		.07⅞@.08½
THORIUM—Nitrate	40@50%	"	4.50
URANIUM—Nitrate	oz.		.25
YTTRIUM—Nitrate	lb.		40.00
ZIRCONIUM—Nitrate	"		8.00

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable.